DOCUMENT RESUME

ED 248 026 PS 014 511

AUTHOR	Fosburg, Linda B.; And Others
TITLE	The Effects of Head Start Health Services: Report of the Head Start Health Evaluation. Volume I and II.
INSTITUTION	Abt Associates, Inc., Cambridge, Mass.
SPONS AGENCY	Administration for Children, Youth, and Families (DHHS), Washington, D.C.
REPORT NO	AAI-84-13; HHS-105-77-1042
PUB DATE	15 Mar 84
NOTE	1,406p.; For the executive summary, see PS 014 512.
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF11/PC57 Plus Postage.
DESCRIPTORS	Child Development; Comparative Analysis; *Health Needs; *Health Programs; Health Services; *Low Income Groups; *Medical Evaluation; Nutrition; Pediatrics; Physical Characteristics; *Preschool Children; Preschool Education; Pretests Posttests; Program Descriptions; Program Effectiveness; Program Evaluation; Research Design; Research Methodology; Rural Urban Differences; Statistics
IDENTIFIERS	Mandatory Programs; *Project Head Start

ABSTRACT

In 1977, a longitudinal study was initiated to assess the effectiveness of health services provided by Head Start. The study provided for 10 domains: pediatric health examinations, health history recordings, dental evaluation, anthropometric assessment, diet and nutrition assessment, and hematology evaluations, as well as for developmental, speech, vision, and hearing evaluations. This report in two volumes presents evaluation findings and technical information related to the study. Volume I, chapter one provides an executive summary including a description of the evaluation project highlights of findings for major evaluation questions, and a detailed summary of findings for each of 10 health services mandated by Head Start performance standards. Chapter two continues with additional detailed descriptions of the Head Start health services. Remaining chapters discuss findings in each of the 10 health domains. Specifically, chapters three through eleven begin with definitions of the health measures and provide background information on their use in collecting data on preschool children. Subsequent sections describe approaches taken in the analysis of the health data, and the final sections present evaluation findings. The appendix to Volume I includes a description of the evaluation methodology and a reference guide to the report and its findings. Volume II contains (1) general appendices listing Head Start performance standards and giving information for interpreting tables of regression results and (2) technical appendices focusing on implementation of the evaluation design; statistics and methodology; description of the Head Start programs, sites, and samples of children; and other relevant materials. (RH)

ED248026

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AAI No. 84-13

THE EFFECTS OF HEAD START HEALTH SERVICES:

REPORT OF THE HEAD START HEALTH EVALUATION

VOLUME I

March 15, 1984

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PS014511

HHS-105-77-1042

Prepared for:
The Administration for Children, Youth and Families
Office of Human Development Services
Department of Health and Human Services
Washington, DC 20201

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FOREWORD

Head Start, a comprehensive program for children from low-income families, has mandated ensuring the physical well-being of children as one of means of ultimately maximizing children's learning experiences in school. Thus Head Start, since it inception in 1965, has provided a wide range of preventive and remedial health services, including periodic assessments of children's health status, prompt attention to factors which threaten to impair their growth, immunizations against infectious diseases, dental examinations and treatment, nutritional and mental health services, and health and nutrition education for parents and children. Some of these health services are provided directly by Head Start--for example, many programs conduct medical and dental examinations while most follow-up health services are provided through referrals to and coordination with other community agencies and health care professionals.

Although national assessments indicated that the overall health status of low-income children improved during the first decade of Head Start operations, they also indicated that many low-income children who were eligible for Head Start services remained at an elevated risk for health problems and required continuing health services. By 1975, the considerable experience Head Start had gained in addressing child health problems made it possible to further improve the program's health component by providing clearcut, standardized guidance to operating agencies about the precise health services to be performed. The Head Start Performance Standards (U. S. Department of Health, Education, and

Welfare, 1975) are detailed regulations for operating all components of the Head Start program, including the health services component.

The Head Start approach to improving the health status of the children and families it served was necessarily extensive, and designed to deliver the needed health services to children under a variety of local circumstances. As set forth in the Head Start Performance Standards, each Head Start agency was responsible for planning and carrying out an effective health services program for all enrolled children and their families. The Performance Standards mandated several general objectives:

- provision of comprehensive health services including medical, dental, mental health, and nutritional services to children;
- promotion of preventive health services; and
- inclusion of the child's parent in health care process though provision of necessary skills and insights to link family to ongoing health care system.

While Head Start has abundantly demonstrated its effectiveness in enhancing the cognitive and social skills of preschoolers, little has been known about the impacts of the Head Start's health component, that is, Head Start's medical, dental and nutritional services. Therefore, in 1977 the Administration for Children, Youth and Families, U.S. Department of Health and Human Services initiated a longitudinal study of the Head Start health services to assess the effectiveness of the health services being provided.

The evaluation employed a longitudinal experimental design, involving random assignment of children to a Head Start and a non-Head Start group and was conducted in four sites. This report presents the findings of the evaluation of the Head Start health services.

Organization of This Report

Chapter One is the Executive Summary. Part I presents an overview of the background of the evaluation. Part II highlights the findings for the major evaluation questions. Part III presents a detailed summary of findings for each of ten health services mandated by the Head Start Performance Standards. A summary of the details of the design of the Head Start Health Evaluation, samples of children recruited, the health measures used, descriptions of the sites and Head Start programs evaluated, and the statistical methods employed are described in Appendix 1A. Appendix 1B provides a cross reference between the findings presented in Chapter One and the remainder of the report. Appendix 1C lists the major contributors to the success of this six-year evaluation. Appendices 1A through 1C are included in Volume I of the report.

Chapter Two continues with a more detailed description of the Head Start health services. Whereas the preceding discussion briefly reflects the health resources available in the local communities, information available as part of site selection, Chapter Two explores Head Start's response to local conditions. It is only in the context of the interplay of health needs, and the health services provided, that the reader can understand the detailed findings of the impact of the Head Start health program on the Head Start participants.

Two Appendix Notes and three technical Appendices provide detailed information regarding certain technical aspects of the evaluation:

- Appendix Note 2-1: Head Start Performance Standards;

- Appendix Note 2-2: Information for Interpreting Tables of Regression Results;
- Technical Appendix 2A: Implementation of the Evaluation Design;
- Technical Appendix 2B: Statistics and Methodology;
- Technical Appendix 2C: Descriptions of the Head Start Program Sites and Samples of Children.

These technical appendices and the appendices to the subsequent chapters are located in Volume II of the Report.

The remaining chapters of this report discuss the findings of the Head Start Health Evaluation in each of the health domains. Chapters Three through Eleven have a standard organization. They begin with definitions of the health indicators (measures) used, and provide background information on their use for collecting data on preschool children. The next section, analysis, describes the approaches taken in the analysis of the health data. The final section presents the findings of the evaluation.

Chapter Three reports the results of the pediatric health examination and child's health history. This evaluation consisted of a review of the health history and a medical examination of the child by a pediatrician. The pediatrician classified any significant present or past medical problems and determined their level of urgency or need for treatment. The types of medical problems and their frequencies are reported within each site.

Chapter Four reports the results of the dental evaluation. This assessment consisted of an examination by a pedodontist to determine the presence and extent of dental caries or occlusion problems. An assessment was also made of the amount of dental plaque and gingival inflammation. The frequencies and types of dental health deficiencies are reported within each site.

Chapter Five reports the results of the anthropometric assessment. The child's height, weight, and triceps skinfold thickness were determined and converted into age-and-sex-adjusted percentiles. The average and median percentiles are reported for each site.

Chapter Six reports the results of the diet and nutrition assessment. This assessment consisted of a 24-hour dietary recall and a three-month food frequency interview given to the mother or guardian of the child. Information on family dietary habits and food practices was also obtained. The 24-hour totals were converted into the percentage of the Recommended Dietary Allowance (RDAA) or other appropriate standards. Mean and median levels are reported for each site.

Chapter Seven reports the results of the hematology evaluation. A sample of blood obtained from each child by venipuncture was assayed for indicators of iron status, vitamin, and cholesterol levels. The indicators are compared to appropriate standards, and the frequencies of deficiencies are reported for each site.

Chapter Eight reports the results of the developmental evaluation. This consisted of the child's performance on the Motor Scale of the McCarthy Scales of Children's Abilities and the mother's report of the child's agressive and/or withdrawn behavior. The child's refusals to attempt the McCarthy tasks were also scored. Mean scores on each scale are reported for each site.

Chapter Nine reports the results of the speech evaluation. This assessment determined speech and language problems for each child in the dominant language (either English or Spanish). The results are compared with age-adjusted norms, and the frequencies of speech and language deficiencies are reported for each site.

Chapter Ten reports the results of the vision evaluation. The vision assessment consisted of a series of vision tests to determine the presence of organic vision deficiencies or deficient visual skills development. The frequency of each type of vision deficiency is reported in each site.

Chapter Eleven reports the results of the hearing evaluation. The hearing assessment consisted of a determination of hearing threshold levels at four frequencies and a tympanometric evaluation of the tympanic membrane. The hearing thresholds were compared with norms for each frequency, and the percentage of children below the norm is reported in each site.

Linda B. Fosburg, Ph.D.
Project Director
March 1984

CHAPTER ONE

EXECUTIVE SUMMARY
PART I

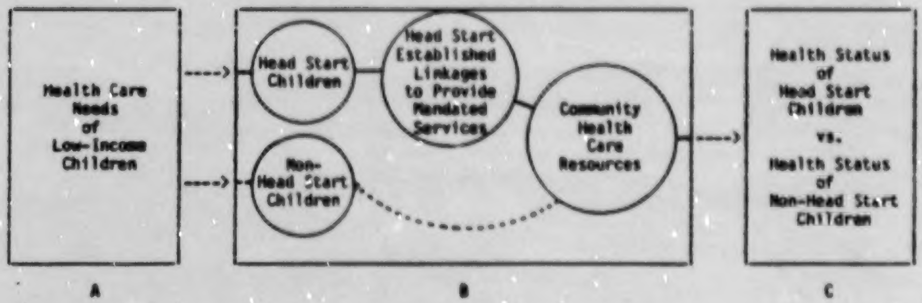
BACKGROUND OF THE HEAD START HEALTH EVALUATION

Purposes of the Head Start Health Evaluation

The major focus of the evaluation was to examine Head Start health services delivery system, how it responds to the health care needs of low-income children, and to what extent it produces improvements in the health status of the children served by the Head Start program. Exhibit 1-1 provides a schematic diagram which illustrates the major features of this system.

Exhibit 1-1

Head Start Health Services Delivery System:
The Linkage between the Health Care Needs
and Health Status of Children
through Utilization of
Community Health Care Resources


Health Care Needs of Low-Income Children
Head Start Children
Non-Head Start Children
Head Start Established Linkages to Provide Mandated Services
Community Health Care Resources
Health Status of Head Start Children vs. Health Status of Non-Head Start Children
A
B
C

Block A represents the health care needs of low-income children (and their families) who are eligible for participation in the Head Start program. Block B represents the community with the

Head Start health services delivery system as a linkage between the Head Start children (with their health needs) and the community health care resources. Block B also depicts the naturally occurring linkages between other low-income children (the non-Head Start children and their families) with community health care resources. Block C represents the impacts of the Head Start health services on health status of participating children and their families, compared to the health status of the non-Head Start children.

The Head Start Health Evaluation examines the Head Start health delivery system and addresses the following questions:

- What is the health status of the children prior to their entry in Head Start?
- What medical, dental and nutritional health services do Head Start children receive through Head Start?
- How do medical, dental and nutritional services received by Head Start children compare to those received by non-Head Start children?
- What are the impacts of Head Start health services on the health status of Head Start children?

By addressing these questions, the Head Start Health Evaluation makes several contributions. It provides confirmation of the previous research on the health status of low-income children and their health needs. The evaluation examines the Head Start program's health services, defined by the Head Start Performance Standards, as implemented in a variety of community contexts confronting Head Start programs. It also determines the extent of services similarly situated low-income children received in the absence of Head Start in the same communities and ascertains whether the implementation of the Head Start health services system ameliorated the health problems of participating children by providing screening, diagnosis, and follow-up treatment. Finally, the evaluation examines whether Head Start health services system had other desirable impacts such as promoting preventive care, linking children and their families with the community's health care systems, and contributing to the optimal development of the child.

The remainder of this chapter summarizes Head Start health services as mandated by the Performance Standards, provides a brief description of the experimental design of the evaluation, and introduces the communities and Head Start programs which participated in the Head Start Health Evaluation.

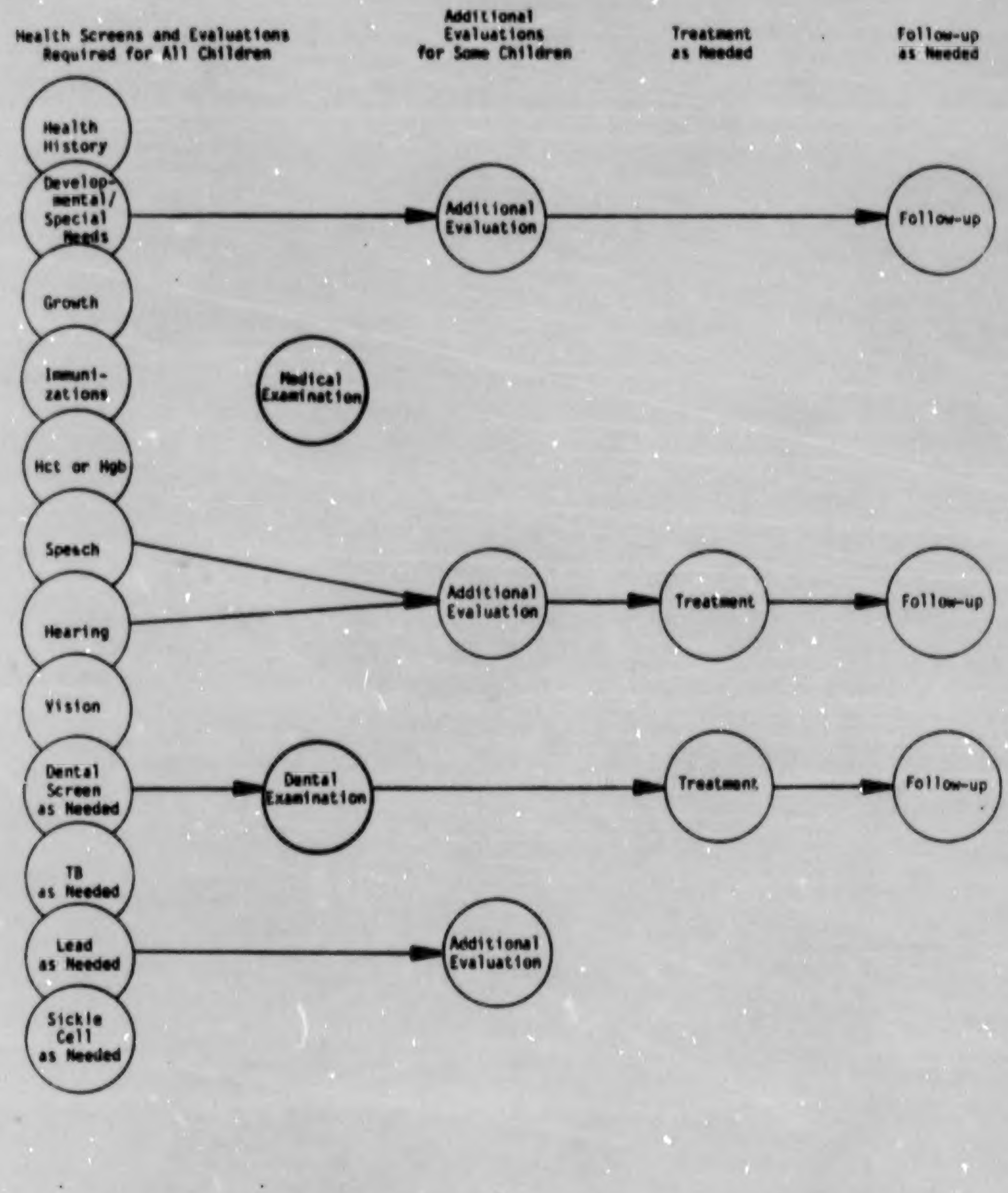
Head Start Health Services

Since its inception in 1965, Head Start has provided over 8.6 million low-income children with a comprehensive program of services. During the year 1980-1981, when the children involved in this evaluation were enrolled, 1,262 Head Start programs served a total enrollment of 387,300 children. Approximately one-third of the programs were located in each of the following types of communities: urban, rural, and a combination of urban and rural. The children served by these programs were mostly between the ages of three and five; only three percent of the children were younger or older.

The Head Start Performance Standards for the delivery of services mandate that each of the children enrolled in the program receive a full battery of health screens and examinations. Treatment and other follow-up are provided on an as-needed basis only. The services mandated and the processes for delivery of the health services are illustrated in Exhibit 1-2. According to the Program Information Records (PIR's) submitted to the Department of Health and Human Services, in 1980-1981, 85 percent of the enrolled chil-

Exhibit 1-2

Head Start Health Services:
The Process Mandated by the Performance Standards


Health Screens and Evaluations Required for All Children
Additional Evaluations for Some Children
Treatment as Needed
Follow-up as Needed
Health History
Developmental/ Special Needs
Growth
Immunizations
Hct or Hgb
Speech
Hearing
Vision
Dental Screen as Needed
TB as Needed
Lead as Needed
Sickle Cell as Needed
Medical Examination
Dental Examination
Additional Evaluation
Additional Evaluation
Additional Evaluation
Treatment
Treatment
Follow-up
Follow-up
Follow-up

dren received medical screening and 92 percent of those needing treatment received it; 78 percent of the children received dental examinations and 87 percent of those needing dental treatment received treatment; and 80 percent of the children completed all of their required immunizations.

To accomplish their mission in the delivery of health services, Head Start developed a staged system for the delivery of health services to participating children which, while addressing all of the mandated health services covered by the Performance Standards, recognizes that many negative health conditions affect only a small minority of the children in Head Start. The system can be summarized as follows: Head Start children are screened for all of the health conditions covered by the Performance Standards; these screens are regarded as preliminary indicators of health problems and those children with negative indications in any health area are referred to the appropriate medical or dental professional for further diagnostic work-up; only those children determined to be in need of treatment are referred for treatment to the appropriate service provider.

In addition to specifying the mandated health services the Performance Standards make recommendations about the type and level of personnel needed to perform the initial health screenings. To contain the costs of delivering services to children, the Performance Standards recommend that some of the screening activities can be performed by para-professional workers. These activities include the medical, dental and developmental health history (collection of medical records, immunization records, and teacher observations), growth assessment, and immunization status assessment. The Performance Standards are less specific about the personnel for the vision and hearing screens and indicate that these screens can be performed by a person trained to administer them to children. The "physical examination" implies a physician's or nurse practitioner's judgment (the physician need not be a pediatrician). The dental examinations require a dentist or dental hygienist (under the supervision of a dentist). In sum, many levels of personnel, from para-professional to professional, may be required to conduct the initial health screens and examinations.

Exhibit 1-2 also illustrates one hypothetical example of the process followed in the delivery of health services to one Head Start child. First, a Head Start staff member obtains the child's health history and then the child receives all of the mandated health screens. Next, the child receives the required medical and dental examinations. In this example, the developmental screen yields suspicious results which require further diagnostic examination by a physician, who recommends no immediate treatment but specifies that additional follow-up will be required. The suspected hearing and speech problems are further evaluated by a speech pathologist who determines that while hearing is, in fact, normal, speech therapy and follow-up will be required. The dental examination finds large numbers of cavities which require two additional visits for restoration and follow-up. Finally, the suspicious lead value is followed by a more precise lead test which proves to be negative, requiring no further action. Thus for this child, the ten mandated health screens and examinations were followed by eight additional health services.

Experimental Design of the Evaluation

The Head Start Health Evaluation was designed to focus on the health status of Head Start children within the context of previous findings and to establish the linkages between the health status of Head Start participants and their participation in Head Start. The general design was to select a sample of Head Start programs (to collect extensive data on program operations) and, within each program, to administer a coordinated battery of health measures to a scientific sample of participants.

The Head Start programs were selected with regard to those program characteristics that would presumptively be related to program performance. Previous research suggested health services for low-income families were likely to be strongly related to such variables as the urban or rural location of the families; the nature of the local health care system (for example, availability of free or subsidized health care); and the region of the country. Consequently these characteristics were applied to the selection of programs to evaluate.

Four Head Start programs, dispersed across four regions of the country, were selected. Half of the sites were predominately urban and the others were rural. (Although some areas in the "urban" sites were rural, the Head Start programs served children from urban locations in the county.) The counties were identified by the U. S. Public Health Service as "underserved" areas in terms of medical and dental services. The strength of the local health care system and the availability of free or subsidized health care for low-income children varied greatly and was an important factor in the delivery and impact of health services on the health status of the children. These issues are highlighted in the descriptions of the Head Start programs included in Appendix I.

Within each of four sites, 200 to 300 children who were eligible to enter Head Start in the fall of 1980 were recruited for the evaluation. These children were divided into groups based on age and sex then randomly assigned to a Head Start experimental or non-Head Start comparison group. A pretest evaluation of the health status of half of each group of children was administered in the spring of 1980, prior to the Head Start group's entry into the program. The posttest of the evaluation, conducted one year later, evaluated the health status of all children in both groups after the Head Start group had nearly completed one year in the program.

Many children recruited for the pretest dropped out of the evaluation. Hence, prior to the posttest, additional children were recruited. The Head Start recruits were first year Head Start participants and the non-Head Start recruits were other similar-aged, low-income children. The major consequence is the distinction between (1) the impacts of Head Start determined by evaluation of the children who received both the pretest and the posttest (longitudinal impacts) and (2) the impacts of Head Start determined by evaluation of all of the children who received the posttest evaluation (cross-sectional impacts or impacts on the total posttest sample). Appendix I provides additional details on the design of the evaluation, the samples of children recruited and the health measures administered.

Summary of Remaining Chapters

Chapter Two highlights the answers to each of the four research questions regarding the health status of the children prior to Head Start entry, the health services received by the Head Start children, a comparison of health received by the Head Start and the non-Head Start children, and the impacts of health services on the health status of the children. Chapter Three provides more detailed findings of the evaluation results for each of the ten areas of health services mandated by the Performance Standards: pediatric health, health history, dental, anthropometric, nutrition, biochemical, developmental, speech and language, vision, and hearing.

EXECUTIVE SUMMARY
PART II

HIGHLIGHTS OF FINDINGS FOR MAJOR QUESTIONS

What Is the Health Status of the Children Prior to Their Entry into Head Start?

Many of the children present a number of health problems which are remediable and require the attention of health care professionals. The following findings are drawn from the pretest of the evaluation. All of the children evaluated were eligible for enrollment into Head Start.

Accidents

Serious accidents were reported to have occurred to 35 percent of the children, including burns (5%) and swallowing poisonous substances (9%).

Perinatal Health

Eleven percent of the children had low or high birth weight, 14 percent had gestation periods of less than 38 weeks or more than 42 weeks and 34 percent had health problems at birth. Some 31 percent of the mothers did not have a prenatal health visit in their first trimester, 34 percent had health problems during their pregnancy and 35 percent had large body weight changes during pregnancy (either increases or decreases.) Twenty percent of the mothers were under 18, as opposed to the national average of six percent.

Pediatric Health

The pediatric examination determined that 53 percent of children eligible to enter Head Start were found to have at least one pedatric problem; 9 percent had middle ear infections; 8 percent had allergies; 7 percent of the children over 4 years of age suffered from eneuresis; 6 percent had asthma; 5 percent had skin problems; 3 percent had psychosocial problems; and 2 percent had urinary infections.

Dental

On the average, a child entering Head Start had 4.6 cavities (decayed surfaces), 0.6 fillings and 0.08 missing teeth. One out of four children urgently needed dental care.

Nutrition

Children entering Head Start had adequate diets for protein, vitamins A, B_{12} C, thiamin, and riboflavin. In general, calcium and iron intakes were marginal, however. In some locations magnesium, phosphorus, niacin and vitamin B_6 and total caloric intake were also marginal.

Motor Development

At pretest, 34 percent of the children entering Head Start scored below the tenth percentile for fine and gross motor skills expected of children of the same age.

Speech and Language

Sixty-three percent of the children at pretest had indications of a speech or language problem. Nearly 90 percent of these children with articulation delays were more than one year behind.

Vision

Sixty-one percent of the children had one or more vision deficiencies.

Hearing

At pretest one out of three children failed the hearing test. Fourteen percent had otitis media.

What Health Services Did the Head Start Children Receive?

Most Head Start children received at least some of the mandated health services; however there were many gaps in coverage. The following findings are drawn from the posttest of the evaluation. The sources of information on Head Start Health Services include: Head Start health records, mother's or principal caretaker's reports, and Head Start Program Information Reports.

Medical Examinations

According to Head Start health records, over 85 percent of the children received a medical examination either immediately prior to or during their first year in Head Start. Of those children examined, 24 percent were found to have medical problems and 56 percent of those with medical problems were treated.

Dental Examinations

For the Head Start children studied, 80 percent received dental examinations. Fifty percent of the children were found to have dental problems. Of those children found to have dental problems, 68 percent were treated.

One of the Head Start programs was unable to arrange for adequate dental services. There, ninety-four percent of the children had decayed teeth at posttest. These cavities were increasing at rate of six per year resulting in an average of 11 cavities per child. Less than 1 percent of the cavities had been filled during the program year.

Nutrition

Head Start children received meals and snacks that provided mandated proportions of children's daily nutrient needs, accounting for up to 50 percent of children's total daily intake. This is particularly important, given the marginal vitamin and mineral intakes of some of the nutrients that were observed in the non-Head Start group. Head Start placed families in need of food assistance in touch with appropriate persons or agencies. Fifty-seven percent of Head Start families were receiving benefits at posttest that they were not receiving at pretest. Families of Head Start children served meals at home that were superior to those served by non-Head Start families in nutritional quality for several nutrients. Program health records show 45 percent of the Head Start children received nutritional assessments.

Blood Tests

For the Head Start children studied, program records showed that 67 percent received blood tests.

Immunizations

For the Head Start children studied, 77 percent were immunized. Thirty-four percent of the children who had been immunized prior to entering Head Start and over 49 percent of all Head Start children were immunized through Head Start during the program year.

Development Assessment

Head Start records show 41 percent of Head Start children received developmental assessments. Of those found to have a problem, one-third received services.

Speech and Language Examination

Thirty-one percent of Head Start children studied received a speech screen. Of those suspected to have a speech problem, 25 percent received a formal speech examination. Followup services were received by 77 percent of the children determined to be in need of speech therapy.

Vision Screening

Fifty-three percent of the Head Start children received a vision screen. Only 31 percent of the children needing follow-up and treatment received it.

Hearing Screen

For the Head Start children studied, 61 percent received a hearing screen. Eighty-two percent of children found to have a hearing or ear infection problem were referred for treatment.

Parent Involvement

Approximately 85 percent of the parents visited a Head Start classroom at least once. On the average, parents visited Head Start classrooms once a week. Of all Head Start parents, 31 percent attended a meeting on food and nutrition.

Health Records and Reports

In the Head Start sample, medical treatment received for children with medical findings was 41 percent below that reported in the Program Information Reports (PIR) (56% vs. 97%). The percentage of children with identified dental problems receiving treatment were 31 percent below those reported in the PIR (68% vs. 99%).

How Did Health Services Received Compare between the Head Start and Non-Head Start Children?

Head Start children were much more likely to receive preventive and remedial health services than other low-income children in their community. The following findings are drawn from the posttest of the evaluation.

Medical Examination

Head Start children were more likely to receive a medical examination than non-Head Start children (86% vs. 68%). More Head Start children received additional preventive health services such as TB tests (67% vs. 42%) and lead tests (15% vs. 8%).

All pediatric problems found during the pretest evaluation were formally communicated to the local Head Start program and to the parent and local physican of the child. Treatment for those pediatric health problems was more likely to be received by Head Start children (46% vs. 36%) and there were likely to be fewer problems (43% vs. 66%) at posttest. Although Head Start children with a single medical problem were more likely to be treated for the problem (44% vs. 22%), Head Start children with multiple medical problems were equally likely to be treated (46% vs. 42%).

Dental Examination

More Head Start children received dental examination (80% vs. 27%). In half of the sites, Head Start children had significantly less dental plaque. As a result of receiving more services, Head Start children were more likely to have fillings (29% vs. 11%). Head Start children were also more likely to have gone to a dentist with their families and were more likely to make such visits regularly.

Nutrition

Head Start families served meals at home that were richer in nutrient quality than non-Head Start families; for example, in the levels of vitamins A and C. Head Start children present in the center consumed appreciably more calories and protein as well as calcium, magnesium, phosphorus, vitamin A, riboflavin, and vitamin B_{12} than Head Start children absent from the center or non-Head Start children.

Speech Evaluation

Many more Head Start children received a speech screen or evaluation (31% vs. 15%). The Head Start children were more likely to receive speech therapy services (77% vs. 0%).

Vision Screen

More Head Start children were likely to receive vision screen or examination (53% vs. 10%). For Head Start children, the examinations were likely to be provided by Head Start staff.

How Did Head Start Health Services Impact the Health Status of the Head Start Children?

Significantly, when the mandated health services were delivered to Head Start children, their health status was substantially improved. The following findings are drawn from both the pretest and the posttest of the evaluation. The sources of information on Head Start health impacts include: mother's or principal caretaker's reports, and results of both the pretest and the posttest evaluation teams' findings.

Pediatric Evaluation

Head Start children, found to have pediatric problems at the pretest, were less likely to have the same problems remaining at posttest than non-Head Start children (43% vs. 66%). This finding was especially significant in one medically underserved site. Without Head Start services, children were much less likely to receive treatment for known medical problems.

Dental Evaluation

In one site, Head Start provided dental examinations to 100 percent of the children, and treated those needing dental services; Head Start children received significantly more fillings of decayed surfaces (4.8 filled surfaces/child vs. 0.06 filled surfaces/child). Head Start children had significantly less plaque on their teeth compared to non-Head Start children in two sites; both sites had flouridated water supplies. In the other two sites with predominately unfluoridated water supplies, both Head Start and non-Head Start had higher and similar levels of plaque. The Head Start children in the latter two sites also had between 178% and 489% more cavities than the Head Start children in the site providing a high level of dental services.

Anthropometry

Significant differences in anthropometric measures were not found.

Nutrition

The nutritional intake evaluation showed the exceptionally positive impacts of Head Start's nutrition services. The Head Start children took in significantly more calories, protein and almost all of the other nutrient studied compared to the non-Head Start children. Head Start children consumed significantly more calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12} at posttest compared to pretest. Non-Head Start children and Head

Start children who were absent from Head Start when their nutritional intake was evaluated did not show these gains in nutrient intake. Families in Head Start were more likely than non-Head Start families to begin receiving food assistance using WIC or WIC plus food stamps (57% vs. 33%).

Biochemical Evaluation

For blood beta-carotene levels, a measure of recent vitamin A intakes, Head Start children had higher levels than the non-Head Start children. In the total posttest sample, 14 percent of the Head Start children had low levels while 24 percent of the non-Head Start children had low levels of beta-carotene. Although there was almost no iron deficiency, Head Start children who received a hemotologic screen from the program were less likely to have abnormal hemoglobin or hematocrit levels at posttest. There were no significant differences between the Head Start and non-Head Start children in blood levels for hematocrit, hemoglobin, FEP, MCHC, TIBC, serum iron, transferrin saturation, or ferritin.

Developmental Evaluation

At posttest Head Start children were more likely to have no problems identified by the battery of measures used in the developmental evaluation of the children (55% vs. 45%). Longitudinal Head Start impacts on children's motor coordination and development were significant for children in one site with a full-time, five-day program. There was also evidence that Head Start had a significant impact on children who performed below the 20th percentile on the McCarthy Scale of Motor Development at pretest. By posttest, 19 percent fewer Head Start children performed below the 20th percentile compared with 4 percent fewer non-Head Start children.

Speech and Language Evaluation

Head Start had positive impact on children with speech and language comprehension problems. Head Start children tested at both pretest and posttest were less likely to have speech and language deficiencies at posttest (38% vs. 52%). There was also evidence at posttest of Head Start's effects on children's speech and language comprehension performance which was related to Head Start's delivery of services. In one site where Head Start program staff had received special speech training, Head Start children had significantly fewer articulation and language comprehension problems.

Vision Evaluation

Fewer Head Start children than non-Head Start children who were evaluated at both pretest and posttest had a vision deficiency at posttest. This trend, although not significant, was consistent across all sites. Otherwise there were no significant differences on the vision evaluation measures.

Hearing Evaluation

For otitis media, the prevalence was 14 percent for the Head Start children and 12 percent for the non-Head Start children There were no significant differences between the two groups of children on any of the other hearing evaluation measures.

EXECUTIVE SUMMARY
PART III

DETAILED SUMMARY OF FINDINGS

Pediatric Health Evaluation and Health History

In the pediatric health evaluation a board-certified pediatrician examined each of the children. The evaluation protocol was adapted from that used by the National Center for Health Statistics in the First National Health and Nutrition Examination Survey and was designed to classify the children's health problems. In addition, each child's mother or guardian was interviewed to obtain a health history. Data from the pediatrician's examination and health history were synthesized and coded into specific health problems, such as otitis media, allergies and pica.

The prevalence of health problems (as defined in this evaluation) among low-income children at pretest was lower than found in earlier national studies of equivalent populations. Fifty-three percent of the children had health problems. The most prevalent problems were:

- allergies;
- asthma;
- dermatologic problems,
- enuresis;
- otitis media;
- pica; and
- surgical problems.

However, prevalence of problems was higher in two sites where access to medical care was difficult for this population.

In addition, the perinatal health history of the mother was analyzed. Pregnancy risk factors included:

- first prenatal visit after the first trimester of pregnancy;
- mother's report of health problems during pregnancy;
- weight loss or gain of more than 30 pounds; and
- mother's age at child's birth less than 18.

Approximately one-third of the mothers reported each of the first three maternal health indicators above. One out of five children were born to mothers who were less than 18 years of age--more than three times higher than the national average.

Head Start's involvement in the delivery of the following medical services was examined:

- medical examination just prior to or during Head Start year;
- presence of a health record on the child (including a health history); and
- documentation of immunization status.

Overall, 85 percent or the Head Start children had received a physical examination and 77 percent had a immunization record. Sixty-seven percent of the children had received a TB test. In St. Clair County, a mostly urban area with many older buildings, two out of three children were tested for lead poisoning from lead-based paint and other sources.

In the longitudinal sample, proportionately fewer Head Start than non-Head Start children who had health problems at pretest continued to have problems at posttest. The positive impacts of Head Start's health services on children were particularly evident in locations where access to services is difficult.

Although there were no differences between groups in the receipt of treatment for illness in the past year, Head Start children were more likely to have received a physical examination and other preventive health services (e.g., TB test, lead test, and immunizations) than children in the non-Head Start group.

Dental Evaluation

Each child received a dental examination by a pedodontist who charted carious lesions on each surface, the number of missing and filled teeth, evidence of gingival inflammation, and occlusion abnormalities. Each mother or primary caretaker was interviewed to obtain a dental history. The examinations and dental histories, coupled with a review of Head Start health records of provision of services, were used to assess the impact of the Head Start program's dental education and services.

The dental health of children in the Head Start Health Evaluation was notably poorer than that of equivalent participants in the Ten-State Nutrition Survey and the First National Health and Nutrition Examination Survey. At pretest, over half of the children had decayed surfaces, and less than 10 percent had any filled teeth. Prevalence of dental problems was highest in 2 out of 4 sites where dental services were scarce and the community water system was not fluoridated. (Fluoride is a known inhibitor of caries development.)

Eight out of ten children enrolled in Head Start received a dental examination and 82 percent of those diagnosed as having dental problems were referred for follow-up services or received treatment. There is strong evidence to suggest that some Head Start procedures for delivering dental services are more effective than others. The one site that examined all Head Start children purchased services on a contractual basis from the local health department. This health department moved a dental clinic in a mobile trailer from site to site, frequently to the parking lot of the Head

Start center. In contrast, two other sites examined about 65 percent percent of the Head Start children in the evaluation. Both of these sites had few dental examination resources available and had to make special arrangements with providers for dental examinations. Children absent from Head Start on examination day usually did not receive one.

Posttest comparisons of the dental health of Head Start and non-Head Start children indicated that systematic provision of Head Start dental services leads to substantial improvements in the dental health of the Head Start children. This is particularly true in one site where the Head Start children received significantly more fillings between pretest and posttest and had a lower prevalence of decayed and missing teeth at posttest. In general, Head Start children were more likely to brush their teeth once-a-day and maintained better hygiene practices than children in the non-Head Start group.

Anthropometric Evaluation

To provide another estimate of the overall well-being of the children, the data collection teams measured height, weight, arm circumference, and triceps skinfold thickness. These anthropometric measurements were compared with reference data from the National Health and Nutrition Examination Survey to obtain age- and gender-specific percentiles expressing the ranking of a child relative to a healthy national reference population of the same age and sex.

According to the pretest evaluation, median height percentiles for children were below the national reference medians. The weight percentiles more closely approximated the national average. Although the younger children in the pretest tended to be below national norms, the posttest evaluation indicated that after age four, the children's average height and weight was nearly at the

50th percentile. Except in one site with a larger proportion of Hispanic children, fewer children were below the 10th height and weight percentiles than found nationally.

In general, the growth status of the Head Start and non-Head Start groups of children was typical of most children in the United States. Given two groups of children with normal growth status, there were few indications of a Head Start impact on that status.

Nutrition Evaluation

The nutrition evaluation focused on the adequacy and quality of the diets consumed by Head Start and non-Head Start children. Information was collected on all foods and beverages consumed by each child in a complete 24-hour period. These data were obtained primarily from each child's mother or principal caregiver. At posttest, direct observations were used to gather information on the foods children received while attending Head Start. The total nutrient content of each child's diet was calculated. The relative quality of children's diets was further assessed through measurement of nutrient density, that is, the amount of the nutrients provided in the diet relative to the total number of calories provided. The 24-hour nutrient totals were subdivided to reflect the nutrient content and nutritional quality of foods provided to the child at home and those provided through Head Start.

The children examined at pretest presented nutritional problems similar to those noted in the Ten State Nutrition Survey and the First Health and Nutrition Examination Survey. The most problematic nutrients were iron and calcium. The average iron intake was below the recommended amount in all four sites; the average calcium intake was below standard in three sites. Total caloric intake was also marginal in two sites.

Posttest analyses examined three groups of children: Head

Start who were present at the Head Start center on the day nutrition information was collected (and had received meals and snacks provided by Head Start), Head Start children who had been absent on the day nutrition information was collected (and therefore had not received Head Start meals and snacks), and non-Head Start children. These analyses revealed that the nutrition component of the Head Start program has a significant and positive effect on the children who received the meals and snacks at the Head Start centers. Positive effects were evident in all four sites; the smallest effects were noted in Maricopa County, where the Head Start nutrition program served fewer meal and snacks than were served in other programs. As a group, the Head Start children who had received the Head Start meals and snacks, had virtually no problems of inadequate or marginal nutrient intake. In contrast, non-Head Start children and the Head Start children who had not received the meals and snacks from Head Start had many more nutrient intake problems. Most profound among these were marginal intakes of both calcium and iron.

Significant Head Start effects were also noted among the children examined at both pretest and posttest. Across all sites, children who had received meals and snacks from Head Start showed pretest to posttest improvement in average intakes of calcium, magnesium, phosphorus, vitamin A, riboflavin and vitamin B_{12}. Non-Head Start children and Head Start children who had not received meals at Head Start, on the other hand, showed no significant improvement in average nutrient intake from pretest to postest. Additionally, the proportion of individual children who recieved less than 100 percent of the recommended intake for any nutrient was substantially decreased (from pretest to posttest) in the group of children who were present at Head Start. These improvements were far less prevalent in the non-Head Start and Head Start-absent groups.

There is strong evidence that the goals and objectives of the Head Start nutrition service program are being successfully achieved. Meals and snacks are nutritionally adequate, balanced and provide 40 to 50 percent of the children's daily nutrient intakes. In contrast, non-Head Start children and Head Start children not attending a center are at risk of consuming an inadequate or marginal diet. The meal service component of the Head Start nutrition program served meals and snacks that successfully provided the mandated proportions of children's average daily nutrient needs (one-third of the RDA for part-day programs; one-half to two-thirds of the RDA for full-day programs).

Significant differences between Head Start and non-Head Start families in the pattern of participation in food assistance programs from pretest to posttest suggest that Head Start may play an important role as facilitator, by putting families in need of food assistance benefits in touch with appropriate persons or agencies. Reported parent education meetings focusing on food and nutrition reached 31 percent of the parents. Nonetheless, the nutritional quality of diets provided to Head Start children at home was superior to that of non-Head Start children in concentration of vitamins A and C and cholesterol and to a lesser extent, the amount of fat and carbohydrate consumed.

Biochemical Evaluation

A blood sample was drawn from 816 children between the ages of 1.8 and 6.6 years. Biochemical analyses focused on an extensive assessment of iron status (including determination of hemoglobin, free erythrocyte protoporphyrin, total iron binding capacity, serum iron, transferrin saturation, and serum ferritin concentrations); an evaluation of vitamin A and vitamin C status; and a determination of serum cholesterol levels.

Compared with findings of the Preschool Nutrition Survey, conducted a decade ago, prevalence at pretest of abnormal hematocrit, serum iron, and transferrin saturation levels were similar. However, a much smaller percentage of the children in this study had abnormal hemoglobin, TIBC, or vitamin A levels. And a much higher proportion of black and Hispanic children in the Head Start Health Evaluation had unacceptably high cholesterol values than was found in the Preschool Nutrition Survey.

At posttest, there was evidence of Head Start impacts on the children from several perspectives. Sixty-seven percent of the Head Start children received a hematologic screening (hematocrit and/or hemoglobin reading) conducted by the program. This is particularly important since there is little evidence that children receive these screens through any source other than Head Start. Second, significantly fewer children screened by Head Start had abnormal hematocrit level or hemoglobin concentrations at posttest (7% vs. 18%). The children with abnormal values at posttest were also more likely to be receiving Food Stamps and/or WIC program benefits, suggesting these programs were well-targeted to children in need. Another significant Head Start impact and reflective of the more nutritional dietary intakes of the Head Start children were the children's serum beta carotene levels. This biochemical measure is an indicator of recent intake of Vitamin A. Iron status and serum cholesterol levels of the two groups were not significantly different.

Developmental Evaluation

The developmental assessment of the Head Start Health Evaluation examined four aspects of the children's development: the children's performance on the Motor Scale of the McCarthy Scales of Children's Abilities; the child's willingness to cooperate with the developmental tester; the parent's report of whether the child behaved in ways which are associated with being overly withdrawn; and the parent's report of whether the child behaved in ways which are associated with being overly aggressive. In addition, data were abstracted from Head Start health records about developmental services (screens, problems identified, and referrals for or treatment of problems) provided to Head Start children.

Pretest results show that 66 percent of the children had some evidence of a development problem on one or more of the four indices. Forty-one percent of the Head Start children were screened for developmental problems. Only one-third of the children who were found to have problems received treatment for those problems.

Head Start has a significant impact on children's motor coordination and development, especially for those children who perform below average on the McCarthy Motor Scale. The impact of Head Start on the children's motor coordination and development was strongest in the site which had the most intensive program, a full-time, five day program. Significant effects were not found in the other sites which have part-day and/or part-week programs. Although Head Start children showed a trend of fewer developmental problems than non-Head Start children, these differences were statistically significant only in one site.

Speech and Language Evaluation

This evaluation included a speech and language comprehension component to identify children with deficiencies in these areas and to determine whether participation in Head Start is associated with remediation of such problems. The speech and language evaluation consisted of the four language comprehensive scales from the Assessment of Children's Language Comprehension (ACLC), the Denver Articulation Screening Examination (DASE), the sentence repetition subtest of the Fluharty Preschool Speech and Language Screening Test, and selected items from the Physician's Developmental Quick Screen for Speech Disorders (PDQ). These tests were administered to all children by a speech pathologist from the local area. Information about speech services was obtained from Head Start programs and from interviews with parents.

At pretest sixty-three percent of the children failed to achieve expected levels of speech and language comprehension. Articulation delays appeared to be more severe than language comprehension delays. Ninety percent of those with articulation problems were at least one year behind.

Head Start records indicate that 31 percent of Head Start children were screened for speech and language problems. Children whose mothers suspected problems or who had medical insurance were more likely to be screened.

There was little evidence of an overall Head Start effect on children's speech and language comprehension. Head Start children in one site where Head Start operates a full-time, five-day program, scored significantly higher in language comprehension, and Head Start children in another site, where Head Start staff had received special speech training, had significantly higher articulation scores and fewer speech problems.

Vision Evaluation

The vision evaluation was administered by an optometrist using the modified clinical technique. It consisted of a battery of tests that measured visual acuity, stereopsis, ocularmotility, binocularity, color discrimination, strabismus, convergence, and the need for lens correction.

Prevalence of vision deficiencies at pretest were 4 percent for visual acuity and 9 percent for strabismus. From among the evaluation's extensive range of vision measures, 61 percent of the children at pretest failed one or more of the measures.

Head Start children were much more likely to have ever been screened for vision deficiencies than children in the non-Head Start group. Head Start children received significantly more vision examinations, usually through the Head Start program. Although such examinations could lead to earlier detection and more effective treatment of vision problems than if first examinations occur later in life, there was no indication that Head Start children had fewer vision problems than children not in Head Start. There also was little indication that Head Start provides more vision services to children or that the program has an impact on Head Start families' use of vision services.

Hearing Evaluation

The hearing evaluation consisted of two parts: testing for hearing threshold levels at each of several frequencies and tympanometric testing for middle-ear impedance. The examination was conducted by audiologists.

Approximately 11 percent of the children at posttest had hearing problems or chronic ear infections (serous or recurrent otitis media). A much higher prevalence rate was found at pretest but the pretest data may simply indicate that the children examined were too young for an accurate hearing evaluation.

Two-thirds of the Head Start children received a hearing screen. Head Start referred 82 percent of children diagnosed to have deficiencies for treatment. There were no differences in the hearing status of Head Start and non-Head Start children at posttest that could be attributed to program intervention.

CHAPTER TWO

HEAD START HEALTH SERVICES: PROCESS AND EXPECTED OUTCOMES

The major focus of this evaluation has been the impact of the Head Start health component on the health status of Head Start children. However, it has been necessary, in order to interpret the observed impacts, to account for differences both in Head Start children's health needs from one program to another, and in the health services provided. For example, an absence of impacts could result either from the absence of need, or the absence, or perhaps ineffectiveness, of the available services. Thus, it was necessary, for the purposes of the evaluation, to measure the incoming health status of the Head Start children, the proferred services and the resulting changes in health status.

Exhibit 1-1 illustrated in a simplified schematic diagram the major points at issue in the Head Start Health Evaluation. Chapter Two focuses on Block B, the Head Start health delivery system. It discusses the objectives of the Head Start Performance Standards in the health domain and the processes mandated by those standards for the delivery of health services. Because of the important variation in the level of available health services, it examines the community context in which each Head Start program delivers health services in order to determine how this affects service delivery. Next it compares the level of each type of service delivered to the established standards. To set these service levels in context, regional and national data are used for comparison. Where possible explanations are offered for the differences in kinds of services available as well as the level of quality of these services. In essence, this chapter provides a framework for understanding the evaluation's findings. Subsequent chapters will examine, for each health domain, the need for services, Block A, and the impact of those services on participants, Block C.

Head Start Performance Standards

The Head Start Performance Standards for the delivery of health services to children provide direction to the programs regarding the acceptable processes for accomplishing their mission in the delivery of health services. Mandated services were listed in Table 1A-5 (with additional detail in Appendix Note 2-1).

Health Service Delivery System

Head Start has developed a staged system for the delivery of health services to ameliorate the health problems of participating children which, while addressing all of the mandated health services covered by the Performance Standards, recognizes that many negative health conditions affect only a small minority of the children in Head Start. Briefly the system can be summarized as follows: Head Start children are screened for all of the health conditions covered by the Performance Standards; these screens are regarded as preliminary indicators of health problems and those children with negative indications in any domain are referred to the appropriate medical or dental professional for further diagnostic workup; only those children determined to be in need of treatment are referred for treatment to the appropriate service provider.

According to the Performance Standards, all of the children entering the program must receive all of their health screens and examinations within 90 days of entry into the program. Thereafter, screens are updated on a predetermined schedule. Some of the health services are performed annually (e.g., an updated developmental and health history and dental examination with prophylaxis), some at the beginning and end of each operating period (e.g., growth assessment), some periodically, usually every two years (e.g., vision and hearing testing and a medical examination), and others are performed only once (e.g, hemoglobin or hematocrit determination). Since children enter Head Start throughout the program year, an ongoing health services program is needed in order to provide screens and examinations within the 90 day limit.

The Performance Standards also make recommendations about the type and level of personnel needed to perform these initial health screening activities. In an effort to contain the costs of delivering services to children, the Performance Standards recommend that some of the screening activities can be performed by para-professional workers. These activities include the medical, dental and developmental health history (collection of medical records, immunization records, and teacher observations), growth assessment, and immunization status assessment. The Performance Standards are less specific about the personnel for the vision and hearing screens and indicate that these screens can be performed by a person trained to administer them to children. Consequently, the personnel administering these screens can vary among programs from Head Start staff to skilled health professionals.

There is no specific guidance in the Performance Standards on the nature of the personnel required to perform medical examinations except that a "physical examination" implies a physician's or nurse practitioner's judgment (the physician need not be a pediatrician). The dental examinations require a dentist or dental hygienist (under the supervision of a dentist). In sum, depending upon the health domain, there are many levels of personnel, from para-professional to professional, required to conduct the initial health screens and examinations. This latitude in the Performance Standards, particularly for vision, hearing, speech, and development, leads to considerable variation in practice among the Head Start programs.

Where practice varies between programs, screening criteria must also be presumed to vary. Recall that the objective of the screens is to flag those children in need of further evaluation by a health professional. According to the Performance Standards only children flagged by the screening activities are to be referred for a further, in-depth diagnostic evaluation. The criteria used in the screening process thus have important ramifications; if they are set inappropriately high or low, the result will be under- or over-referral. Under-referral will mean that children in need of specific diagnostic evaluation, and perhaps treatment, will not receive that appraisal or treatment. Over-referral will increase costs because more children than necessary will be referred for professional diagnostic evaluations. While it is unrealistic to assume that precise criteria can be set or maintained, considerable additional attention to this problem is merited because the entire structure of health service delivery is critically dependent on the choices made at this stage.

For illustration consider the process that was illustrated in Exhibit 1-2. If it is assumed that professional and paraprofessional judgments in this case were uniformly "correct" then this child has received optimum health care. However, small changes in screening practice could have lead to substantial changes in treatment. If the screening levels for the developmental tests were set higher, the child might never have been referred for additional evaluation, and thus not have received the appropriate follow-up. If the screening level for vision was set somewhat lower the child might unnecessarily have been referred for a costly examination by an optometrist or opthomologist.

Implications for Program Accountability

The Performance Standards allow local screening criteria to be set by local Head Start Health Services Advisory Committees. These committees, composed of local health professionals, are often the service providers used by Head Start. They reflect local health practices, and, based on the review of this evaluation, clearly demonstrate that clinical practice in the area of preventive health care is in no way monolithic. For example, while a given dental condition in a four-year-old child might, in one site, lead to an extraction, in another the tooth might be filled, while still another site would do nothing (and wait for secondary dentition). Similar variability exists in medical practice for vision, developmental, and other special needs areas (practice in the other health domains is more homogeneous).

Whereas this "local option" is undoubtedly necessary, and follows standard practice of reliance on "clinical judgment", it does complicate the national management of the health component (and the evaluation of this component). It means that national program managers must be careful to recognize that the screening rates and referrals reported in Head Start's Program Information Record (PIR) do not necessarily convey the same information from site to site. Further scrutiny of local health records is necessary in order to determine local practice.

Until recently, another management evaluation tool was available, the Comprehensive Management Reviews (CMR's) to provide this fine-grained information. Using the Head Start Performance Standards as the criteria for performance appraisal, the CMR's were conducted periodically on each program by an outside team of specialists. This team reviewed each area covered by the Performance Standards. Data from this review supplemented data from the Program Information Record (PIR). Thus, the PIR's basic information such as enrollment, number of children receiving health services, and number of children diagnosed to have handicapping conditions was augmented by much more in-depth data. However, the CMR's have recently been dropped, leaving the PIR as the main indicator of program performance. Unfortunately, as will be illustrated later in the chapter, the PIR does not seem to be providing all the information necessary to assess accurately the degree to which the programs are providing Head Start children with the mandated health services.

To summarize the preceding discussion, the limited specificity of the Performance Standards has the following implications:

- The qualifications of personnel used to perform health screens and health services can vary from program to program;
- Some children may not receive all mandated health screens, especially speech and developmental; and
- The exact criteria for "flags" of specific health problems can vary from program to program and result in variation in what is considered "a problem" and how such a problem is treated.

Hence, delivery of the mandated health services varies considerably from program to program because of differences in the interpretation of the objectives of the Performance Standards and differences in the processes used to meet these objectives. Furthermore, these important differences are often not reflected in the PIR.

Community Context for Health Services Delivery

Since Head Start mediates the delivery of most health services rather than directly delivering such care, Head Start health coordinators are constrained by local conditions and practices. Head Start's health service delivery in a given site is highly dependent upon the demographic and health service characteristics of the program's catchment area as well as upon certain characteristics of the local Head Start program. The sites selected for the Head Start Health Evaluation varied on a number of important characteristics which have implications for the level of effort required to deliver health services to Head Start children, and for the results of those efforts. The relevant site characteristics are summarized in this chapter and described in more detail in Technical Appendix 2C: Descriptions of the Head Start Program Sites and Samples of Children.

Some recurring elements are worthy of mention at the outset. Programs serving populations largely eligible to receive Aid to Families with Dependent Children (AFDC) are often more likely to be able to finance health care services through cooperation with the Medicaid program (though this is not true in Arizona, where there was no Medicaid program at that time of the evaluation), thus placing less of a burden on Head Start resources. On the other hand, certain Head Start program characteristics, such as high attrition among participating children, are likely to be related to higher costs and poorer service delivery, since those who enter late, after the program year has begun, are more difficult to schedule for routine health screening. Scheduling problems also abound in those programs which provide fewer contact hours per week, and thus have less access to the children.

The Head Start Health Evaluation sites have made numerous unique arrangements, in the light of local conditions, to use the local health care system to facilitate the delivery of Head Start's mandated health services. The following descriptions provide a summary of some of the distinguishing features of health care at these study sites.

Greene and Humphreys Counties

Under perhaps the most challenging conditions observed in this evaluation, the Head Start program has assumed almost the entire responsibility for the delivery of health services to children in this site. Both of these counties are very rural and have few locally available health services. To deliver the mandated services, given the local paucity of such services, the Head Start program must annually develop its own health services delivery system using central office staff, and professionals from Jackson, Mississippi, to perform the medical and dental screens and examinations of Head Start children.

Most of the health screens performed in these sites were done by paraprofessional Head Start staff trained to perform the specific screens. Occasionally, Head Start trains local staff, but more frequently trained Head Start staff members circulate among all thirteen counties served by this grantee. For example, the central office used the services of a dental assistant to screen children for dental services. In addition, Head Start had to hire physicians and a nurse practitioner from Jackson to perform medical examinations.

Since children attend Head Start five days per week, scheduling screens and examinations is fairly easy. Too, the turnover of children in the program is low, so once health screening has been completed for a program year, it does not have to be repeated for new children.

The costs of health service delivery were born by Head Start. Very little use was made of Medicaid reimbursements during the evaluation year because of lack of coordination with the Welfare Department. Although considerable effort was made to involve Head Start parents when their child needed referral or treatment, it required considerable staff time to provide case management to ensure that the parents made and kept necessary appointments. Head Start's excellent relationships with local health care providers, however, meant that when families missed appointments, the providers called on Head Start to remind the parents of the importance of obtaining needed health services. Without such cooperation an already burdensome system might well have proved too unwieldly.

Several changes have occurred since the evaluation. Improved cooperation with the Welfare Department now means that more children receive health services reimbursed by Medicaid. Head Start has also compensated for the lack of a local optometrist by enlisting the cooperation of a highly qualified optometrist to conduct vision screens of Head Start children in Humphreys County. Thus, as is typical of many local Head Start programs, the local health coordinators must make adjustments in the program from year to year.

St. Clair County

The responsibility for delivery of health services in this site was shared between the Head Start program and the children's parents. Health services in St. Clair County, and particularly in East St. Louis, are readily available. Consequently, Head Start can rely on local health providers for many of the required services. In particular, services were so widely available that the St. Clair County Head Start program could require parents to provide evidence of a medical examination as part of the child's application to Head Start. (Recently, the admissions policy was modified to require evidence of a dental examination as well).

Most of the medical examinations of the children were performed by pediatricians in private practice or in primary care clinics. Other mandated screens and examinations were conducted after the Head Start health coordinator had reviewed the children's health examination records and determined what additional health screens and services were required. A summer clinic was scheduled at one of the local health clinics to complete some of the missing screens, e.g., lead poisoning, hemoglobins and dental examinations. Additional health screens were completed during the program year, some by trained Head Start staff, and the remainder by health professionals in nearby facilities.

Scheduling health services is complicated in this program because some children attend Head Start for two days per week while others attend for four days. This scheduling problem, coupled with high turnover among Head Start children, make screening and service provision more difficult to administer, thus engendering a heavy management burden for the Head Start program staff. The high rate of turnover, in particular, meant that although additional screening and examinations were often required during the program year, scheduling was difficult and screens were often left undone.

The costs of delivering health services to the Head Start children in this site are relatfvely low because most health services are Medicaid reimbursable or are paid for in-kind. Head Start encourages parents to follow-up for necessary services, and occasionally provides transportation or makes appointments.

Several changes in procedures have occurred since the evaluation. As mentioned above, parents are now responsible for dental as well as medical examinations prior to application to Head Start. The program has begun a summer clinic which is designed to provide all additional required screens during the same appointment. (This procedure was modeled on the one used in the Head Start Health Evaluation. More than one site found this an efficient and effective approach to delivering these services.)

Maricopa County

The Maricopa County Head Start program delegates the responsibility for delivery of health services to Head Start children to the Maricopa County Health Department, through a formal arrangement which operates like a health maintenance organization (HMO). The health department has a well-organized and extensive delivery system in place in the county and provides the Head Start children with all of the needed medical and dental screens, examinations, and services (or makes arrangements with other community agencies for these services) at a fixed cost per child ($165).

Most of the medical and dental screens and examinations are provided by a combination of professional and para-professional health department staff. For most health screens and services, children are transported to the nearest primary care clinic. Dental examinations and services are provided through a mobile dental trailer. Scheduling services is particularly easy since most children attend Head Start four days per week and the dental trailer is parked on the Head Start lot. Parents are invited to be present during the dental examination. This provides an opportunity to teach them appropriate dental hygiene practices for themselves and their children.

Because of this HMO-like arrangement, the management burden for Head Start was very low; even scheduling and delivering services was the responsibility of a health department nurse. Thus, whereas at most sites Head Start maintains the health records, in Maricopa County the health records of the children were kept at the health department and the Health Department assumed the responsibility for delivery of those services. Head Start monitored that delivery through means of an independent medical auditor who reviewed health records for the program.

Though Arizona has no Medicaid program, the health department managed and administered program was an effective and cost-containing option. The costs of health services were fixed at $165 per child for all services including treatment.

Some notable changes have occurred in the program since the evaluation. Since the county now provides transportation to Head Start children, it is possible to recruit children from poorer families who formerly were not eligible for Head Start because their families had no means of transporting them. Further, the health department now provides nutrition assessments of the children. However, service costs continue to rise--currently they are at $254 per child.

Mingo County

The Mingo County Head Start program assumes responsibility for delivery of all medical and dental screens and examinations to Head Start children. Since this county is very rural, and only some of the required services are available, Head Start must make special arrangements for other services from Charleston, West Virginia. In addition, continual flux in the local availability of health services forces the Head Start health coordinator to make frequent changes in health care arrangements.

Most of the medical examinations provided during the evaluation were conducted by a local physician. A State-supported dental clinic conducted dental examinations and provided treatment. The remainder of the required services and health screens were provided by a variety of other health professionals and para-professionals.

Given the paucity of services, Head Start's management burden was high. In addition, management problems were exacerbated by the untimely loss of the health coordinator during the evaluation year which, coupled with other Head Start staffing changes, lead to a fragmented health service delivery effort. A Comprehensive Management Review (CMR) of this program, conducted just prior to the posttest data collection, showed that the program was out-of-compliance with the Head Start Performance Standards on 87 items, many of them pertaining to the delivery of health services. (CMR's of the other programs were much more positive.) The delivery of health services to Head Start children in this site was the most chaotic in the evaluation.

Costs of health service delivery were shared by Head Start, parents, Medicaid, and the state (grants for dental examinations). Head Start paid for medical examinations, but if any treatment or follow-up was needed, it became the responsibility of the parent.

Several changes have occurred since the evaluation. A new and experienced Head Start director has been appointed and many management changes have been undertaken. Furthermore, the program now has a health services trailer in which to conduct medical examinations and other health screens. This greatly simplifies the enormous management problems that previously plagued the health component.

Health Service Delivery

The delivery of the full range of mandated health services to Head Start children from screening through diagnosis and treatment, hinges on the effectiveness of the Head Start program's health care management. If the child is not screened, then the child never even enters the health service delivery system. Moreover, failure at any subsequent stage of the health service delivery system will diminish the overall impact of the services. Thus, the extent to which Head Start's health service delivery system attains the desired impact depends, to a large extent, on the detailed process by which each Head Start program manages and implements its health service delivery system.

The four Head Start programs examined in the evaluation have implemented different approaches to the delivery of the mandated health services. These different systems provide some insights into the relationship between system management and structure, and the ultimate success of the system. Each program's approach depended in large part upon the available health care facilities in the local communities, and the ingenuity of the Head Start staff. A comparative summary of these four systems follows. The specific details of these systems are described in Exhibit 2-1. (This exhibit is intended also as a reference for use with the following chapters.)

Managing Health Screens

Health screens can be managed in several ways. First, the Head Start program can require that the parent provide evidence of a health screen as part of the Head Start application. This is done in St. Clair County (for physical examinations) and results in high completion rates. Second, the Head Start program can itself make arrangements to provide screens and examinations in a single location at a single time. This strategy, used in Maricopa County for medical screens, also had a relatively high completion rate. A third option is for Head Start to administer a system which delivers different health screens sequentially, on different days, frequently at different locations. This last strategy was used by both Greene and Humphreys Counties and Mingo County for most health screens.

Exhibit 2-1

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Physical Examination				
Process for delivery	Head Start contracted with pediatricians and nurse practitioners from health clinics in Jackson to examine children in Head Start centers.	Head Start required parents to submit results of child's physical examination (conducted by private practitioners or primary care clinics) with Head Start application; otherwise Head Start made arrangements with health clinic.	Head Start contracts with Maricopa County Health Department which manages examinations of children at the Primary Care Clinics.	Head Start transported children to private physicians's office for examination.
Cost of the examination	$12/child (no cost for a few known EPSDT-eligible children who were examined at Health Department).	No cost-EPSDT reimburseable or in-kind.	$165 per child (for medical and dental services), plus $4500 for medical audit of contract.	$8 per child (not EPSDT reimburseable).
Process if treatment required	Head Start notifies parents and encourages parent to follow-up. Head Start provides transportation and assistance with making appointments. Health care providers call Head Start when appointments missed.	Head Start helped parents with follow-up treatments.	Health Department notifies parents and coordinates delivery of needed services.	Physician reported to Head Start . Head Start notified parents and encouraged follow-up. Head Start occasionally provided transportation.
Average cost of treatments paid by Head Start	$50-60	No EPSDT reimburseable or in-kind.	Included in above cost.	Parent's responsibility or EPSDT reimburseable.
Changes since 1980-81	Head Start receives list of EPSDT-eligible children; EPSDT reimburses contracted examinations of those children.	No changes mentioned.	Contracted costs per child have increased to $201 in 1981-82 and $234 in 1982-83.	Head Start transports children to a health care trailer located at one of the Head Start centers. All children are EPSDT-eligible and examinations are reimbursed by EPSDT.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Dental Examination				
Process for delivery	Dental assistants, from central office, examined Head Start children in centers and prioritized need for services. Head Start transported children to a local dentist for examinations (in Humphreys County and in a county neighboring Greene County); there was no prophylaxis or fluoride application.	Head Start conducted, during the summer, a health clinic for all entering children. Services included screening, prophylaxis, and fluoride application.	Head Start contracts with the Maricopa County Health Department. Dental hygienist screens children at entry to determine priority for treatment. Head Start transports children most in need to dental trailer. Otherwise dental trailer makes rounds of Head Start centers annually.	Head Start transports children to State-supported dental clinics for examination and prophylaxis by dentists.
Cost	--	EPSDT reimbursable, otherwise $21 per child.	Included in contract ($165 per child).	No cost to Head Start.
Process if treatment required	Dentists submit treatment plan to Head Start with estimated costs (up to $800 per child). Costs are negotiated and treatments given if the budget will permit the expenditures.	Head Start transports children to dentists office.	Treatments given in dental trailer.	If child were complaining or had toothache, Head Start paid to have tooth pulled. Otherwise, parent was informed of needed services.
Average cost of treatments	$250 per child	Varies considerably and sometimes provided in-kind.	Included in above cost.	Parent's responsibility.
Changes since 1980-81	No changes mentioned.	Head Start requires evidence of a dental examination as part of the Head Start application, usually EPSDT reimbursable.	No change, except cost.	Dental examinations are no longer State supported and currently cost $30 per child, and not Medicaid reimbursable.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Vision Screening				
Process for delivery	Head Start central office trains Head Start staff to perform screens in Head Start centers. Head Start refers children needing further evaluation to professionals (locally in Humphreys County and in a county neighboring Greene County).	Head Start staff perform screens in Head Start centers. Head Start refers children needing further evaluation to East Side Health District.	Health Department nurses conduct screens in Head Start classrooms.	Head Start staff - conducted vision screens of children at Head Start centers.
Cost (professional evaluation)	$30 per child.	No cost.	Included in contract ($165 per child).	No cost.
Process if treatment required	Parent informed; Head Start uses own resources, if necessary.	Parents informed; Head Start makes arrangements with opthmologist.	Referred to Crippled Children's.	Lion's Club provides assistance if child needs glasses.
Average costs of treatments	$115 for glasses.	—	No cost to Head Start.	No cost to Head Start.
Changes since 1980-81	Head Start contracts with an optometrist to perform vision screens on all children (in Humphreys County).	Head Start conducts all screens in summer using a multi-disciplinary professional team.	No change, except cost.	No changes mentioned.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Hearing Screening				
Process for delivery	Head Start central office trains Head Start staff to perform screens in Head Start centers. Head Start refers children needing further evaluation to professionals (locally in Humphreys County and in a county neighboring Greene County).	Head Start staff perform screens in Head Start centers. Head Start refers children needing further evaluation to East Side Health District.	Health Department nurses conduct screens in Head Start classrooms.	Crippled Children's personnel conducted hearing screens.
Cost (professional evaluation)	$50.	No cost.	Included in contract ($165 per child).	No cost to Head Start.
Process if treatment required	Parent informed; Head Start uses own resources, if necessary.	Parents informed; Head Start makes arrangements with E.N.T. specialist.	Follow-ups conducted in classroom by specialist referred by Crippled Children's.	Crippled Children's provided follow-up services as needed.
Average costs of treatment	$200 for hearing aid	---	No cost to Head Start.	No cost to Head Start.
Changes since 1980-81	No changes mentioned.	Head Start conducts all screens in summer using a multidisciplinary professional team.	No change, except cost.	Hearing evaluations now cost $25 per child.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Speech Screening				
Process for delivery	Head Start trains own staff to perform screen. Head Start refers children needing further evaluation to professionals (outside both counties).	St. Louis University staff screen children.	If requested by parent or teacher, Handicapped Services Department screened children.	If requested by parents or teacher, Head Start referred child to speech pathologist (from Charleston) for evaluation.
Cost (professional) evaluation)	$30-35.	---	No cost to Head Start.	No cost to Head Start.
Process if treatment required	Parent informed; Head Start uses own resources if necessary.	Parent informed; University staff provide treatment in Head Start center unless child requires individual work (conducted at University).	Parent informed.	Parent informed; speech pathologist prepared manual and trained classroom staff to work daily with children in need.
Average costs of treatment	$5 per session for 20 to 25 sessions.	---	No cost to Head Start.	Staff time.
Changes since 1980-81	No changes mentioned.	Head Start conducts all screens in summer using a multidisciplinary professional team.	No changes mentioned.	Speech evaluations now cost $25 per child.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Developmental Screening				
Process for delivery	Head Start teachers perform. Head Start refers children needing further evaluation to mental health professionals (outside both counties)	East St. Louis School District 189 administered screens to all children	Head Start teachers conduct non-standard assessment and referred some children for further assessment	Head Start teachers performed developmental assessment of child's progress three times per year.
Cost (professional evaluation)	$125 per day	No cost	---	Staff time
Process if treatment required	Head Start contracts 3 to 4 per month in each county for professional services to aid children in need	---	Professional assessment leads to Individualized Education Program (IEP); professional trained Head Start staff or student intern to help child with useful exercises	Head Start refers children to Special Children's group (in Charleston) which provides services.
Average costs of treatment	$125 per day	---	---	No cost to Head Start
Changes since 1980-81	No changes mentioned	Head Start conducts all screens in summer using a multi-disciplinary team	No changes mentioned	Head Start central office staff (rather than teachers) recruit. All children now EPSDT eligible and over 10 percent have serious handicapping conditions. Center staff have been trained to manage these chilren's problems.

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Nutrition Screening				
Process for delivery	Head Start staff perform in Head Start centers.	Nutrition consultants visited each Head Start center 2 to 3 times during the year, screened a few children and provided nutrition education to parents.	Head Start staff nutritionist performed nutrition assessments.	Head Start does not have a nutritionist. The County Extension Home Economist provides some nutrition guidance to the centers on menus.
Cost	Staff time	---	Staff time	No cost to Head Start
Process if treatment required				
Average costs of treatment				
Changes since 1980-81		Head Start conducts all screens, including nutrition, in summer using multidisciplinary team	Health department staff perform nutrition assessment	

Exhibit 2-1 (Continued)

Description of Head Start Health Service Delivery

Head Start Health Services	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Health education				
Process for delivery	Head Start scheduled regular meetings with parents. Attendance was poor. Head Start sends monthly newsletter	Head Start conducts meetings on nutrition (4-6 seminars) mental health (group therapy) and lead poisoning. Attendance poor.	Head Start conducted seminars for parents on nutrition, childhood diseases, what to expect from Health Department's medical and dental examinations. Approximately 1/3 of the parents participated regularly in programs or as classroom volunteers. Health Department also offered crisis intervention, planned parenthood, drug and alcohol abuse programs.	Head Start conducted few meetings for parents. Attendance was very poor.
Changes since 1980-81	Parent participation is improved. Emphasis on parent involvement is higher.		No chnages mentioned.	Head Start has conducted a needs assessment of what parents wants and want and will incorporate results into their program.

While, in practice, all of these strategies can work, they require varying amounts of management skill and resources to succeed in providing the mandated health screens. The first strategy requires the least program management support, but only works under conditions where parents can obtain health services with little assistance. It is also a strategy which can be very effective for programs with high turnover. Since, using this approach, programs need not themselves maintain ongoing health services, the many new enrollees may be screened as they enter throughout the program year without cost to the program.

The third strategy is the most difficult. There are numerous opportunities for gaps in service delivery. Children are likely to miss one screen or another. Only careful management, of the kind practiced in Greene and Humphreys Counties, can keep track of needed services. Because of the added management burden this last approach can be very costly (for example for scheduling and bringing outside health professionals into the community). While some improvement in management efficiency can be gained by more tightly scheduling health screens, the lack of local health facilities will invariably make providing rural health care both more difficult and more expensive.

Service Priorities

Another issue strongly related to whether or not particular screens are conducted in a site is the local priority given to the particular health screen by the Head Start staff. Although the Performance Standards mandate delivery of all health screens and examinations shown in Exhibit 1-2, compliance varies with the local priorities. In many cases there priorities are based on the reporting requirements of the PIR.

To the extent a particular health service is given high priority by the local staff, it appears more likely that the service will be delivered. Services reported on specifically in the PIR (medical examinations*, dental examinations and immunizations) receive the most attention and attain the highest completion rates. For example, because the rate of immunization tends to be low among low-income children, immunizations have been made a high priority health goal for Head Start. Consequently, Head Start programs, in all sites (except Mingo County) placed a high priority on this service and substantially improved the rates of immunizations among the children they served. Compliance with the Performance Standards for other services, such as vision and developmental screens, is much lower. Since these particular screens need not even be singled out for reporting in the PIR, they are given a lower priority by some Head Start programs. Thus, given a multitude of competing demands, some screens are given short shrift.

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*The distinction between medical screens and medical examinations as reported in the PIR is explained in the next section.

Responsibility for Follow-up

The extent to which the Head Start program takes responsibility for case management and delivery of treatments to children has, in large measure, important implications for whether or not prescribed treatments are delivered. As is seen in Greene and Humphreys Counties, it is possible with community support, to integrate parents into this phase of the health care delivery system and, with careful monitoring, provide the necessary support to parents so that needed treatments are obtained. However, in programs such as Mingo County where Head Start does not take adequate responsibility for follow-up, the system can break down and, often as not, a child can go without needed care. To be effective, Head Start must not abdicate, even to parents, its reponsibility for monitoring the delivery of services.

Flux in Availability of Services

The degree to which the Head Start program interacts with a stable health care system in a community also has important implications for the amount of Head Start management support required to operate the mandated health care delivery system. In a location like Maricopa County which has a stable and well-managed health care delivery system, the Head Start program need only negotiate price for services for the Head Start children. In all the other programs, the annual need to identify service providers and renegotiate the cost for their services is a time-consuming process over which Head Start has little control. Some programs, like Greene and Humphreys Counties and Mingo County, put considerable effort each year into the configuration of the health care delivery system. Since their community's systems are often in flux, it is not easy to predict from year to year what will work and what will not. In such sites, a strong training and assistance program for Head Start's health care coordinators is essential if the coordinator is to master the complex health care issues with which she will typically be confronted.

Payment Mechanisms

According to Head Start regulations, Head Start program funds for health services for children are to be used for direct payments to providers only in the last resort. Such an approach means that time must be spent to identify workable alternatives. In some cases, staff time consumed in identifying alternatives may be more costly than if the Head Start program had purchased the services directly. In Maricopa County, for example, where there was no Medicaid and no other payment alternative was feasible, the Head Start program paid a fixed amount per child to get the job done. It appears that the vast majority of the children not only received all of the required screens but are more likely than in other sites to receive the necessary treatments, all this with minimum management support on Head Start's part.

On the other hand, in some sites, making arrangements for payments through Medicaid for some children and directly paying for others requires an enormous amount of staff time, a cost which has to be considered in computing the total cost of health care services. In some of these instances it might have been more cost-effective to pay directly for services.

Placement of Health Care Facilities

Provision of health care services is highly constrained in some locations by the lack of convenient facilities. It often becomes necessary to transport children to obtain needed services. The necessity of improving access was evident in these programs. The closer the facility was to the children, the greater the likelihood that the children would receive services.

All programs attempted to solve this problem. In Greene and Humphreys Counties the Head Start centers were used for many of the health

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screens, thus bringing health screens to the children. Maricopa County utilized the health departments' primary care clinics for most health screens and a mobile dental trailer (parked at the Head Start center) for the dental screens and treatments. For the services it provided directly, St. Clair County used one local health clinic for some services and the Head Start centers for others. Mingo County transported children out to physicians offices for medical and dental examinations and conducted other screens at the Head Start centers.

Health Services Delivered by Head Start

The Head Start Performance Standards mandate delivery of certain medical and dental screens to all children. Since Head Start keeps records of these screens and examinations in health records for each of the children, it is possible by examining these records to determine whether all of the mandated screens and examinations were delivered.

Exhibit 2-2 shows the percentage of Head Start children in the Head Start Health Evaluation who had received each of the mandated health screens. Examination of their health records revealed that only one Head Start program (Maricopa County) succeeded in providing all of the Head Start children (included in the evaluation) with most of the health services mandated in the Performance Standards. However, all four of the Head Start programs were relatively successful in providing the children with medical and dental examinations (between 65 and 100 percent of the children in each site were examined). All of the children (except 20 in Mingo County with no health records at all) had a health history in their health record. In all sites but Mingo County Head Start was also very successful in providing immunizations (to between 85 and 99 percent of the children). However, the screening rates for the remaining health services were frequently lower than 50 percent of the children. Speech and developmental screens were provided least frequently.

The pattern of service delivery, shown here is for children who entered the program in the fall and who have now participated in Head Start for at least eight months (health records reviewed in May 1981). It is indicative of each program's success in screening children and indicates that (with the exception of speech and developmental screens) all programs attempted to deliver all of the screens to the children at least once.

Exhibit 2-2

Percent of Head Start Children Receiving Health Examinations and Screens Mandated by the Performance Standards as Shown in Head Start Health Records

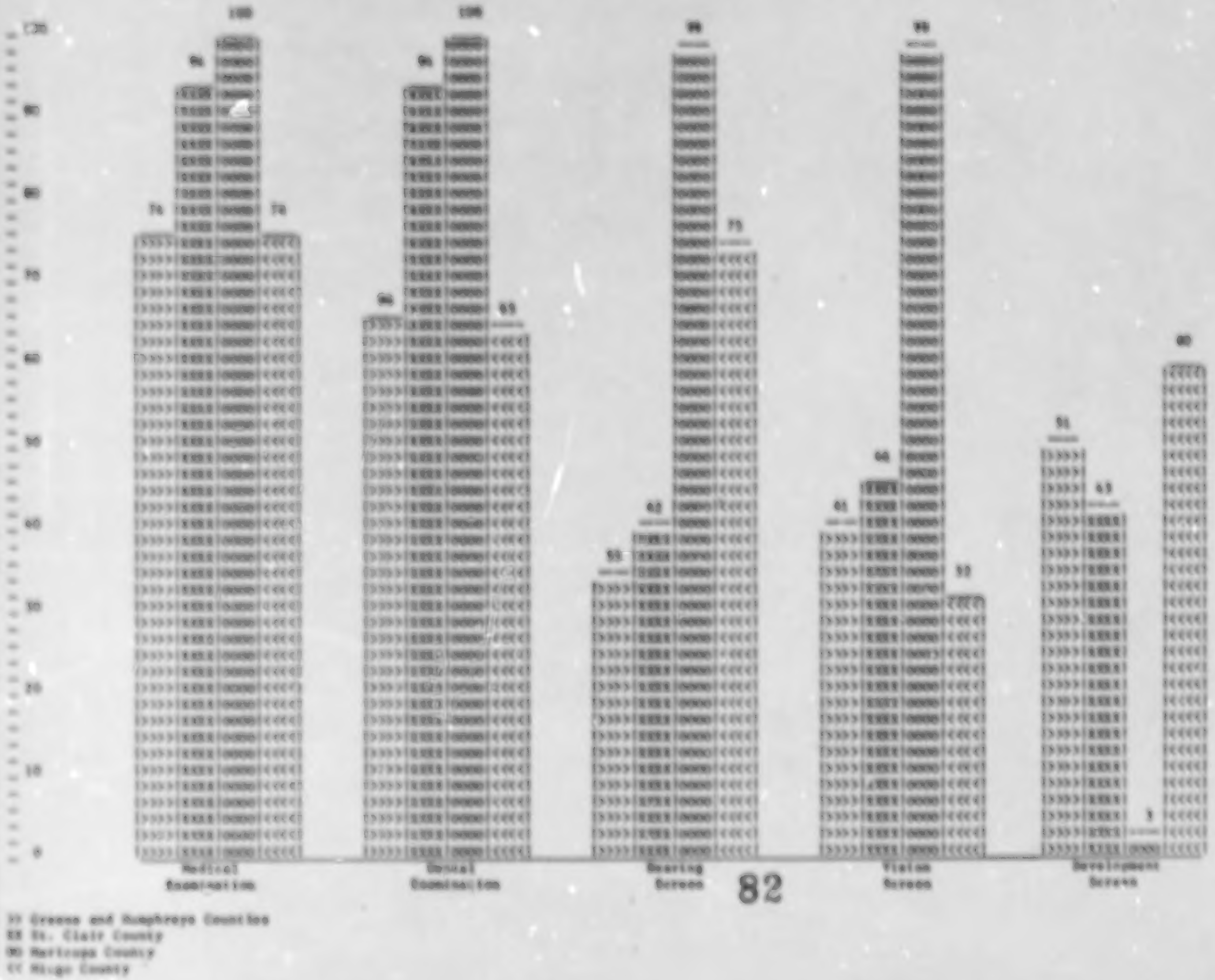
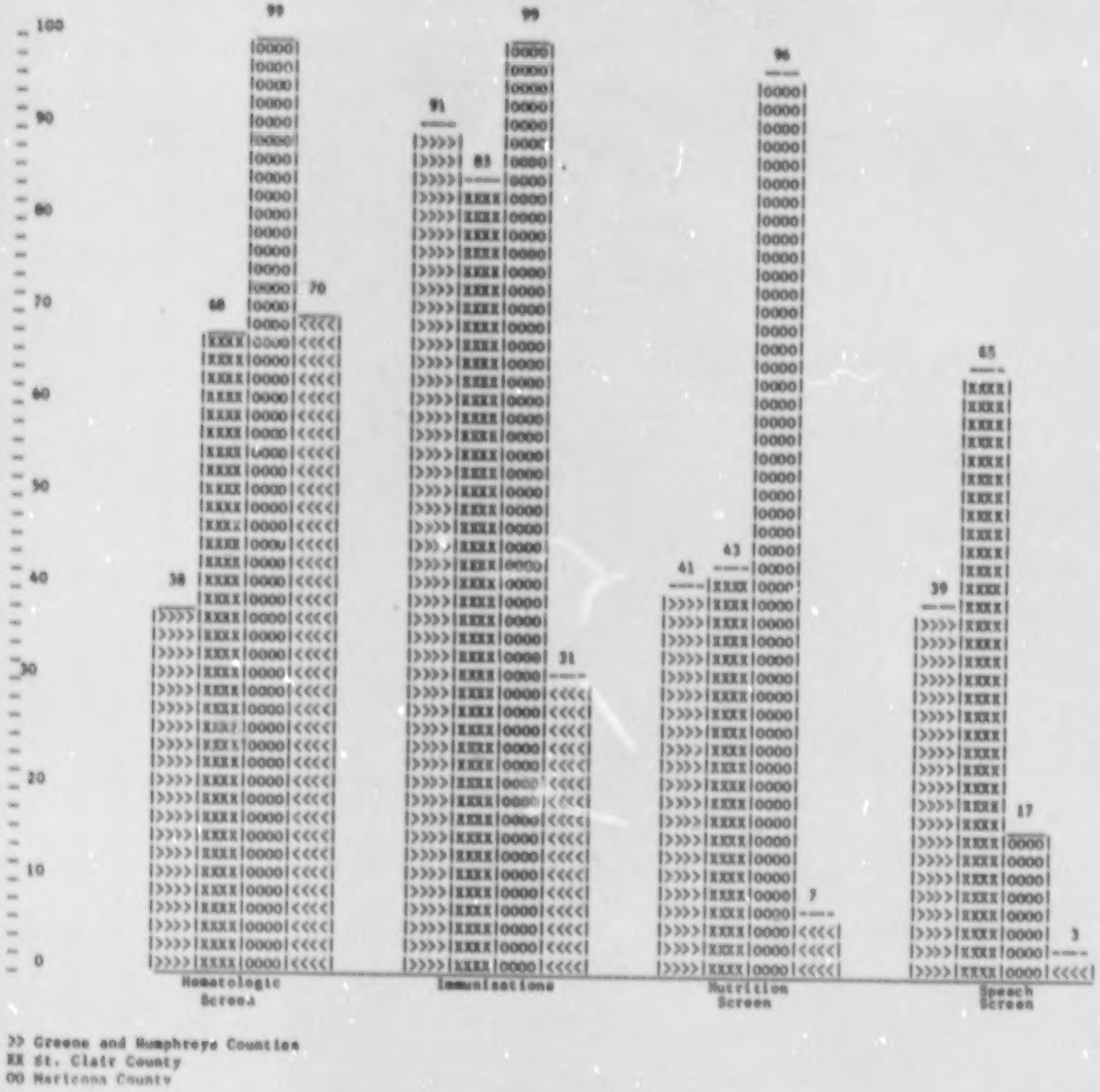


Exhibit 2-2 (Continued)

Percent of Head Start Children Receiving Health Examinations and Screens Mandated by the Performance Standards as Shown in Head Start Health Records



Comparisons with Health Services Delivered by Other Head Start Programs

It is reasonable to wonder whether the health services delivered by programs studied in the Head Start Health Evaluation are "typical" of those of other Head Start programs. Comparisons are possible using two other estimates of health service delivery:

- the local Program Information Record (PIR), a Head Start form submitted annually to the regional and national Head Start Office for Program Management. This form collects various descriptors of each Head Start program, including the number of children actually served and the proportion receiving various health services;
- the U.S. Department of Health and Human Services regional averages for health services delivered, an aggregate of the local PIRs for each region. National averages, across all regions, are also available.

On the basis of the 1980-81 PIR information, the Head Start Health Evaluation sites provide health services to enrolled children at a rate typical of national estimates. Exhibit 2-3 presents comparisons between the levels of health services provided to Head Start children within each of the four sites and aggregated across all four sites. Across all sites, the four programs report providing medical screens to 81 percent of their entire enrollment, and the national average for medical screens in 1980-81 was 85 percent. There is some variability within sites, but with the exception of Greene and Humphreys Counties the local PIR and regional estimates are quite similar, supporting the notion that the provision of medical screens in each of these sites is typical of Head Start performance elsewhere in the region (according to Head Start's records).

Similarly, the four site average and the national average on percent of children with medical findings (22% vs. 25%) and percent receiving treatment for medical problems (97% vs. 92%) are also very comparable. For particular sites, however, there are some differences between the site PIR and the regional averages. St. Clair County reports fewer medical findings and somewhat less treatment of medical problems than is reflected in the average levels reported from its region (Region 7). The other sites, however, report more medical problems and more treatment than their regional averages.

Exhibit 2-3

Comparisons of Head Start Health Services Delivered According to the Local PIR[a], and Regional (National) Averages[b]

		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		PIR	Regional Average	PIR	Regional Average	PIR	Regional Average	PIR	Regional Average	PIR	National Average
Total Enrollment		620		899		458		345		2322	
Percent Receiving Medical Screens	n %	365/620 58.9	88.9	814/899 90.5	84.4	400/458 87.3	81.5	310/345 89.9	83.7	1889/2322 81.4	84.5
Percent with Medical Findings	n %	104/365 28.5	23.6	47/814 5.8	22.6	162/400 40.5	20.7	110/310 35.5	28.1	423/1889 22.4	26.9
Percent Receiving Medical Treatment	n %	104/104 100.0	93.8	35/47 74.5	88.2	161/162 99.4	92.8	110/110 100.0	90.8	410/423 96.9	91.8
Percent Receiving Dental Examination	n %	97/620 15.6	75.2	780/899 86.8	79.7	415/458 90.6	74.8	300/345 87.0	79.8	1592/2322 68.6	78.0
Percent with Dental Findings	n %	97/97 100.0	36.7	67/780 8.6	34.2	272/415 65.5	45.1	156/300 52.0	38.7	592/1592 37.2	42.3
Percent Receiving Dental Treatment	n %	97/97 100.0	90.2	67/67 100.0	83.3	264/272 97.1	90.7	156/156 100.0	85.4	584/592 98.6	87.4
Percent Receiving Immunizations	n %	590/620 95.2	86.1	741/899 82.4	76.9	355/458 77.5	77.4	229/345 66.4	76.9	1915/2322 82.5	79.7

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[a] Base is total actual local enrollment reported in Program Information Record in all programs except for Friends of Children. The latter pertains to Greene and Humphreys Counties only.

[b] Base is total grantees in region.

The estimates of children receiving dental examinations, presented in the bottom half of Exhibit 2-3, reveal a similar pattern of Head Start health services. The major divergency is in the local PIR for Greene and Humphreys Counties. This shows that only 16 percent of the children in that site received a dental examination, compared to the regional average of 75 percent. Because Greene County had no dentist for most of the 1980-81 program year (but has obtained one since), this local impact on delivery of dental services is plausible. The four site averages are also similar to the national averages for percent of children with dental findings (37% vs. 42%) and those receiving dental services (99% vs. 87%). Once again, St. Clair County reports a substantially smaller proportion of children with dental findings than regional estimates (9% vs. 34%), but all sites report a slightly higher proportion of children receiving dental treatment.

The four sites in the Head Start Health Evaluation report rates of immunizations for their children which are very similar to their regional averages and, on average, to the national estimate (83% vs. 80%). Mingo County reports the lowest immunization rate, and is the only site whose immunization rate falls below its regional average (66% vs. 77%).

The PIR also reports information on the utilization of Medicaid as a financing mechanism for Head Start's delivery of health services, including medical and dental screens and treatments. On the average, as shown in Appendix Table 2-1, the proportion of Head Start children with Medicaid coverage across the four sites is only slightly below the national average of 47 percent. There is great variation, however, from none in Maricopa County to 76 percent in St. Clair County. Only in Greene and Humphreys is the proportion of Medicaid eligible children similar to regional averages.

Evaluation Review of Service Delivery Data

Comparisons of the health records of the Head Start children in the evaluation with the local PIR reports are shown in Exhibit 2-4 and Table 2-2. Although the evaluation children are only a subset of the enrollment of any grantee, comparisons between their receipt of health services and those reported in the PIR provide validation of the PIR information. What emerges suggests that there may be some problems in the PIR reports.

Exhibit 2-4

Comparisons of Head Start Health Services Delivered According to the Local PIR[a], the Abstract of Local Health Records of the Evaluation of Children[b], and Regional (National) Estimates

		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		PIR	Abstract Records	PIR	Abstract Records	PIR	Abstract Record	PIR	Abstract Records	PIR	Abstract Records
Total Enrollment		620	127	899	108	458	102	345	112	2322	449
Percent Receiving Medical Screens	n %	365/620 58.9	94/127 74.0	814/899 90.5	102/108 94.4	400/458 87.3	102/102 100.0	310/345 89.9	83/112 74.1	1889/2322 81.4	381/449 84.9
Percent with Medical Findings	n %	104/365 28.5	45/94 47.9	47/814 5.8	2/102 2.0	162/400 40.5	33/102 32.4	110/310 35.5	13/83 15.7	423/1889 22.4	93/381 24.4
Percent Receiving Medical Treatment	n %	104/104 100.0	25/45 55.6	35/47 74.5	0/2 0.0	161/162 99.4	18/33 54.5	110/110 100.0	9/13 69.2	410/423 96.9	52/93 55.9
Percent Receiving Dental Examinations	n %	97/620 15.6	84/127 66.1	780/899 86.8	102/108 94.4	415/458 90.6	102/102 100.0	300/345 87.0	73/112 65.2	1592/2322 68.6	361/449 80.4
Percent with Dental Findings	n %	97/97 100.0	22/84 26.2	67/780 8.6	46/102 45.1	272/415 65.5	93/102 91.2	156/300 52.0	19/73 26.0	592/1592 37.2	180/361 49.9
Percent Receiving Dental Treatment	n %	97/97 100.0	13/22 59.1	67/67 100.0	26/46 56.5	264/272 97.1	69/93 74.2	156/156 100.0	15/19 78.9	584/592 98.6	123/180 68.3
Percent Receiving Immunizations	n %	590/620 95.2	116/127 91.3	741/899 82.4	92/108 85.2	355/458 77.5	101/102 99.0	229/345 66.4	35/112 31.3	1915/2322 82.5	344/449 76.6

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[a] Base is total actual local enrollment reported in Program Information Record except for Greene and Hum[illegible]eys Counties which is the disaggregated numbers specific to those counties.

[b] Base is total Head Start group included in evaluation and percentage reflects medical examinations, only.

[c] Base is total grantees in region.

The Head Start Health Evaluation's review of children's health records as shown in Exhibit 2-4 indicates that 85 percent received Head Start medical screens, exactly the national average (see Exhibit 2-2), but four percent more than reported in the PIR for these sites. A number of explanations could account for this small difference. However, the data does not seem to support the contention that the Head Start programs paid any "extra attention" to the children included in the evaluation. A more likely explanation for this difference is that, whereas the evaluation's estimates of service delivery are based on the evaluation children who were in the Head Start program from the beginning of the program year in September through May (when the health record review was conducted), local PIR estimates include anyone who ever participated in the program in that year, including dropouts. Thus, the evaluation's estimates, reported here, provide an indicator of the performance of Head Start in delivering medical screens to children who remain in the program throughout the year.

The same argument is true also for dental examinations with one major exception. In Greene and Humphreys Counties, it appears that practically the only children who received dental examinations were those included in the evaluation. (It also is difficult to understand the reported percentages for dental findings and treatments based on our reviews of the children's records.)

Comparisons of the rates of medical screens with rates of medical examinations reported in the children's health records and those shown in Exhibit 2-4 raises other questions. The estimates shown for percent receiving medical screens, as reported in the PIR, are supposed to be the percentage of children "who have completed medical screening, including all appropriate tests and physical examinations." These screens and examinations include health history, growth assessment, hemoglobin or hematocrit determination, hearing test, vision test, physical examination and other screens recommended by the local Health Services Advisory Committee. It appears, however, that the percentages reported in the PIR for medical screens are comparable only to the proportion of children receiving medical examinations. Although the medical examinations conceivably contain portions of the other required screens, this is not the intention of the PIR instructions, nor does this reporting practice reflect the contents of the children's health records for receipt of the other screens.

Exhibit 2-4 also compares the percent of children with medical and dental findings and treatments received according to the PIR versus the health records of the children included in the evaluation. There are strikingly few similarities between the PIR reports of medical or dental findings and treatments and the estimates based on abstracting the health records of the children in the evaluation. With the exception of Greene and Humphreys Counties, all sites reported more medical findings and much more medical treatment. Differences were also striking on dental findings and treatment. PIR reports of the proportions of children receiving treatments for medical or dental problems were 97 to 100 percent except in one instance (75% received medical treatment in St. Clair County); the evaluation's estimates ranged from 0 to 69 percent; and the average difference in estimates was 40 percent.

For both the medical and the dental reports, differences between the local PIR reports and the review of the local health records for the children in the evaluation strongly suggest that programs may have juggled the numbers reported in the PIR. Although two sites made extensive use of clinics in the delivery of services, this does not account for the discrepancies between their PIR reports and our estimates based on a sample of the same source for their PIR report, the Head Start health records.

The PIR reports on the use of Medicaid in paying for health services are similar to those reported previously in the program descriptions and those available from evaluation data (see Appendix Table 2-2). Neither Greene and Humphreys Counties nor Maricopa County reports use of Medicaid. St. Clair County, however, makes almost exclusive use of Medicaid for medical and dental services, and Mingo County makes high use of Medicaid for dental but not medical services.

Service Delivery Patterns

As shown in Exhibit 2-2, the overall rates of service delivery, according to the Head Start health records, range from 85 percent for medical examinations, 80 percent for dental examinations, and 77 percent for immunizations to 31 percent for speech screens, 40 percent for developmental screens and 45 percent for nutritional assessments. Given these rates, the evaluation focused on whether all children were equally likely to receive services or whether some particular characteristics of the children or their families might influence their receipt of services. For example, were children most in need or with most problems more likely to receive services through Head Start? The following discussion addresses these and other issues related to service delivery and briefly reflects on the anticipated consequences of these patterns of service delivery on the overall health impacts of the program.

Children in Most Need

Various groups of children (who because of low per capita income, low mother's education or age, lack of medical insurance or Medicaid, lack of benefits from WIC or Food Stamps, and difficulty of access to medical services) were considered at risk in terms of demographic characteristics. The evaluation examined the possibility that Head Start was targeting these children for services. The results, discussed in more detail in Technical Appendix 2C, indicate that Head Start children in Maricopa County receive services regardless of special need. No special group of children were more or less likely to receive services. Children without medical insurance or Medicaid were more likely to receive vision and hearing screens (in Greene and Humphreys Counties and St. Clair County) but less likely to receive dental treatments (in St. Clair County). Children in Mingo County who were not receiving Food Stamps or WIC were less likely to receive hearing and hematology screens. Hence, overall, it does not appear that Head Start made health screening and delivery decisions based on whether or not the child was a member of the above special groups.

Children with One or More Health Problems

Another way to examine the impact of Head Start on the children "most in need" is to look at those with the most health problems in various health domains (e.g., speech, hearing, and hematology) according to the Head Start health records, to determine whether children with multiple problems were more likely than children with single problems to be treated. According to that information, only in St. Clair County were children with multiple problems significantly more likely to receive treatment for those problems than if they had a single problem. (There was a similar but not significant trend in Mingo County.) Technical Appendix 2C provides additional information on this issue.

Children with Medical Problems at Pretest

During the pretest in Spring 1980, 114 children (who returned for the posttest) were found to have one or more specific medical problems. During the posttest, the physician reexamined the child for evidence of these (and other) problems and asked the parent whether the child had received treatment for the problems found at pretest. Head Start children were twice as likely as non-Head Start children to have received treatment for a single problem (44% vs. 22%). However, both groups of children received treatment for multiple medical problems at the same rate (46% vs. 42%). Chapter Three (and Table 3-17) presents additional discussion of this issue.

Children with Health Problems at Posttest

The Head Start children who had health problems in a particular domain at posttest were also examined to determine whether Head Start had screened them at a higher rate than children with no problems. As shown in Technical Appendix 2C, children in Maricopa County with language problems were more likely to be screened. A similar trend (though not statistically significant) occurred for children with language problems in Mingo County and overall for children with vision problems. Hence, it appeared that children with chronic vision and language problems were more likely to be screened by Head Start.

General Issues of Health Services Delivery

From the preceding chapter it is apparent that Head Start programs can operate under several very different models of health care delivery. Further, it appears that several issues confront the Head Start programs in their efforts to deliver the services mandated by the Head Start Performance Standards to all Head Start children. Based on our experience with each of the four programs and their frank discussions about successes and difficulties in delivering the mandated health services, the following issues are critical to have an effective program for health services delivery.

Head Start must manage the delivery of health services. Numerous configurations of health care delivery can be effective and efficient, but they all must share certain characteristics. To be efficient the system must be stable from year to year. To be effective the system must supplement those health care services available in the community with those remaining services which Head Start must procure to meet its mandates. If either the efficiency or the effectiveness of health services delivery system is "at risk" through constant flux or lack of funding for health services, then the roles of the Head Start program director and health services coordinator are crucial.

When one considers that the Performance Standards mandate a minimum of ten medical and dental screens and examinations for each child, just providing these services (and keeping accurate records) is an enormous task. Following-up on all suspected problems and providing the recommended course of treatment is yet another major undertaking.

Without an effective local health care system, Head Start must train and supervise their own staff to provide these services. If there is high turnover among the Head Start staff performing screens, additional training must occur. If the health providers in the community change the amount, quality, or costs of service, then Head Start must renegotiate procurement of those services. If Medicaid or other forms of public support for health services are not available in the community (or if health care providers will not accept these forms of third-party payment), then Head Start must either negotiate a means for providing the services in-kind, rely on parents to take responsibility, or substantially increase Head Start costs. Stable and resourceful management of the system is thus an essential feature of any successful Head Start health component.

In those instances where a health service delivery system, extant in the community, can provide health care to low-income children at a reasonable cost, Head Start can delegate a large portion of the responsibility for the health component to that community system, that is, providing there are adequate management, coordination, and oversight safeguards. However, there must always be a clear understanding that Head Start must take the final responsibility for the stability and delivery of services.

Parents must be involved. Since ultimately the parent is responsible for the health care of the child, it generally is deemed essential to involve parents in the delivery of the mandated health services. However, since the parent's comprehension of the need for particular health services and the means of obtaining such services is often low, Head Start must often invest considerable time in integrating parents into the process, and providing one or both parents with essential information. Based on this evaluation team's experience with providing parents and local health care providers with a detailed report of the health problem findings resulting from the pretest evaluation, and chronicling the follow-up (as well as assuming Head Start's role in the cases of the non-Head Start children with serious health problems requiring urgent attention), it is abundantly evident that parents are concerned about their children, but their knowledge and skills to access needed health services is limited. Involving parents is not equivalent to directing parents to access health services by themselves. To be effective modiators of health services for their child, parents must learn more about child health, how to care for their child's health (what they can do and who else can help), and how to obtain health care services in their community. Without this learning process, few parents can be expected to interact effectively with the health care delivery system.

Additional Head Start health care costs are modest. The additional costs of delivering all the mandated Head Start health services are modest. There are choices. Two types of costs are incurred for health service delivery--costs of managing the system and costs of providing services to children. Both are inescapable and, within a fixed budget, trade-offs are made, one against the other. To date, the Head Start strategy has been to be the health provider of last resort--an efficient strategy for keeping the direct payments to health care providers as low as possible. However, one can question how efficient this approach is when this lack substantially increases the management costs to Head Start in those instances where it is difficult to arrange for services.

Thus, where there are sufficient local health services and a public health service system in the community, Head Start serves in a coordinating function and relies heavily on the strength and stability of the community's health service resources to provide necessary services. In this instance, Head Start management costs are generally low. Costs for services will also be low if third party or in-kind payments can be arranged, as is often the case. Where such arrangements are not possible Head Start costs increase. These increases can be managed, however.

One alternative some Head Start programs use to control health expenditures is to place more responsibility for the delivery of health care on the parents. However, this strategy does not appear to work either effectively or efficiently. In essence, such a strategy forces Head Start to manage an extraordinarily diffuse system composed of Head Start parents. Head Start can not effectively manage all those parents, nor can it count on effectively communicating all of the information required for parents to take full responsibility. Thus, many children go without needed health care.

Another more efficient alternative in those communities where health care system does not adequately serve all low-income families is for Head Start to expend more of its own resources to install and maintain its own health service delivery system. Such a system can effectively provide health services to Head Start children, for example, given a strong health coordinator and the good will of the local health service providers. In such a system, health service costs can be negotiated and although this may require considerable management resources given the complexity of the problem, the cost benefits can be realized. Thus, it should be recognized that programs which are confronted with such difficult situations may fare poorly, given the magnitude of their responsibilities. This does not mean that they are necessarily poor programs but that, given the complexities of running a health care system, and the extensiveness of the health mandates contained in the Performance Standards, modest additional health care expenditures coupled with strong management support and training will often be required to pull a program through and achieve an effective health care delivery system for Head Start children.

CHAPTER THREE

PEDIATRIC HEALTH EVALUATION AND HEALTH HISTORY

Pediatric Health Indicators

Although children in the United States today enjoy better health than children 10 years ago, major problems remain among children being raised in families with very little income, especially those low-income families with only one parent. "Children in inner-city slums, in the hills of Appalachia, or in the families of migrant workers may be in extreme poverty and ill health. Special surveys . . . document the health conditions and special needs of these children" (U.S. Department of Health and Human Services, 1981, Vol. 3, p. 41).

As a comprehensive developmental program, Head Start was concerned from the outset that poor health was likely to be a problem for the low-income children served by the program. From the perspective that low-income children were likely to have more health problems than middle class children and were also likely to have more difficulties obtaining necessary health services for prevention and remediation, the Head Start programs included a health service component. As early as the first year of the program in the summer of 1965, the health service program was viewed as one of the "substantial successes" of Head Start. Funds were available to perform medical examinations and preventive services, but not treatment. North (1979) described the experience in 1965 as follows:

> No Head Start funds had been budgeted for such treatment, and few programs were able to put together the resources to ensure that problems discovered through Head Start were actually treated. In this, Head Start was the victim not only of its own unrealistic expectation that treatment resources would generally be available for children with identified problems, but also of a long and dreary tradition of school health programs and well-baby clinics. Such programs, fearing to encroach on the private practice of medicine, had "referred" children found to need treatment to physicians or clinics, usually by simply asking the parent to obtain such care from whatever source the parent thought most appropriate. Responsibility ended with such referral, and this concept of limited responsibility

> persisted in many Head Start programs. Despite Head Start's later attempts to banish this tradition, it was still evident a decade later in the Early and Periodic Screening, Diagnostic, and Treatment Program under Medicaid (pp. 232-233).

By 1975, the health service component of the Head Start program, was still considered a "substantial success." Although more funds were now available for Head Start health services, serious questions still remained:

- Who was to pay for the services?
- Who was responsible for follow-up?
- What was the parents' responsibility?
- To what extent could Head Start rely on other community health programs?
- What constituted compliance?

By 1975, detailed regulations in the form of the Head Start Performance Standards were issued covering all areas of Head Start policy, including health. Because the health component was now believed to be fully implemented, the Administration for Children, Youth and Families also began planning an evaluation of that component. The purposes of that evaluation were to determine whether the Performance Standards were being implemented as intended and whether their implementation led to the desired impacts.

One portion of the evaluation of the health component, the pediatric health assessment is discussed in this chapter. Other portions of the health component evaluations are discussed in succeeding chapters. The purposes of the Pediatric Health Evaluation were three-fold: to document the general health status of the children from low-income families, to document the health services provided by Head Start, and to examine the impact of Head Start's health services component on the health of children, as it is delivered currently. Using samples of Head Start and non-Head Start children at the posttest, the Head Start Health Evaluation examined the changes in the health status of the children during their enrollment in Head Start and assessed which changes could be attributed to Head Start.

The information was collected through a combination of examinations by a board-certified pediatrician, health history interviews with the parents or guardians, and abstracts of the Head Start health records of the Head Start children. The manner of identifying health problems during the evaluation was therefore similar to that which occurs in a well-child examination. That is, the health status of the children was likely to be "healthy" and the problems which could be reported were likely to be predominantly chronic (from mild to moderate severity) with few acute problems (because the parents would not bring in the children for the evaluation if they were "sick".)

The pediatric evaluation was administered by one of a team of board-certified pediatricians from Boston City Hospital and the Department of Pediatrics of the Boston University School of Medicine. The protocol for the pediatrician's examination was adapted from that used by the National Center for Health Statistics in the First National Health and Nutrition Examination Survey.

The health history form was adapted from items on the patient-intake form used at Children's Hospital Medical Center, Boston, Massachusetts and from other surveys of child health. The health history included inquiries concerning the mother's pregnancy history; her health-related attitudes; and the child's birth, hospitalizations, medications, diseases, health-related habits (e.g., pica--craving for unnatural food), and serious accidents. Although some items are important for this evaluation, per se, much of the health history was intended to provide the examining physician with sufficient information to assess the health status of a child adequately. The health history was obtained through an interview administered to each child's mother or guardian by a non-health professional who had been trained by a physician. This interview was conducted by members of the evaluation team before the pediatric examination. The examining physician reviewed this health history before conducting the pediatric examination. Exhibit 3-1 summarizes the health history measures that were used.

After reviewing the health history and examining the child, the pediatrician summarized the collective findings in terms of health problems. For example, given a record indicating an abnormal tympanogram, a history of ear infections, a scarred ear drum, and abnormal drum mobility and color, the examining pediatrician might indicate a health problem of recurrent otitis media on a summary problem sheet. Self-limiting diseases, such as a cold, were not considered problems by this health evaluation. In addition, conditions which could be more precisely defined by data from other portions

Exhibit 3-1

Health History Measures Reported from Parent Interview

General Estimate of Child's Health	Parental assessment of child's health as excellent, very good, good, fair, or poor.
Serious Accidents	Number of occurrences of accidents resulting in a broken bone, a burn bad enough to require medical treatment, a cut requiring stitches, consumption of medicine or poison, being knocked-out, and/or going to an emergency room.
Pica	Frequency of consumption of seven types of non-food items (clay, laundry starch, paint or plaster, dirt or mud, newspapers or comic books, large quantities of ice, crayons).
Health Problems at Birth	Incidence of problems requiring special treatment or extended hospitalization (such as low birth weight, jaundice, blueness, respiratory problems, convulsions, or infections).
Congenital Problems	Incidence of conditions at birth involving specific organ systems--heart, eyes, ears, mouth or throat, stomach or intestines, kidney or urinary system, muscles, joints or bones, brain or nervous system.
Chronic Conditions	Incidence of the following selected chronic conditions--diabetes, sickle cell anemia, congenital heart conditions, vision trouble, polio/paralysis, emotional problems, mental retardation, or tuberculosis.
Infections and Other	Incidence of specific illnesses, frequency of occurrence, and the time since the most recent occurrence of pneumonia, convulsions, meningitis, arthritis, anemia, urinary or kidney infections, ear infections, asthma, diarrhea, vomiting, and fainting or blackouts.

of the evaluation were not included in the pediatric examination's list of health problems (e.g., anemia, growth stunting, obesity, dental caries, and hearing and vision deficiencies). The examining pediatrician graded each problem according to severity, chronicity, and urgency of treatment needs.

After data collection, each summary health problem sheet was reviewed by a single pediatrician to ensure consistency. Problems were classified to facilitate analysis. Problem classifications included a distinction between infectious and noninfectious problems, and between organic and psychosocial problems. A designation of "possible problem" was used for findings which might or might not be considered as problems, depending upon other specific information or findings not available at the time of the examination (e.g., pica or enuresis). In addition, problems were classified according to the affected system and the specific condition (e.g., dermatologic--eczema; neurologic--ptosis).

Posttest data were collected about the utilization of health services to determine their impact on the health status of the children. Two data sources were used: the Head Start health records and the parent's report. Health Start health records on each child were abstracted to obtain information about the provision of health services (e.g., medical examinations or speech evaluation). However, these records did not specify the content of the health services to the extent that might be found in a medical chart.

After the pretest, each child's local physician had received a complete summary of the evaluation's findings at pretest. (Head Start children's evaluation summaries were also shared with the local Head Start program.) During the posttest evaluation, the examining pediatrician interviewed mothers of children who had pediatric problems identified at pretest to ascertain whether treatment had been received since pretest, whether the treatment had been provided through Head Start, and whether the problem was still present at posttest. Since self-limiting health problems were not included in this list from pretest, many of the problems could be expected to be still present, but it was deemed important to assess if they were now medically managed.

The overall goal of the health history and pediatric examination was to answer the following questions:

- What is the prevalence of pediatric health problems in Head Start-eligible children?
- What health services does Head Start provide to children?
- Do children receive services through sources other than Head Start?
- What is the impact of the Head Start health service on the children's health status?

Analysis of Pediatric Health Indicators

Most of the analyses for these data are simple tabulations of frequencies for items by site. All are unweighted for the few fluctuations in sample characteristics, because although there may be differences between the Head Start and non-Head Start children in a particular sample in one site, these differences usually disappear when samples are combined, e.g., the cross-sectional posttest children in Samples A, B, and C. Statistical comparisons for these tabulations used conventional chi-squared tests of independence. In the case of health problems, the frequencies may be interpreted as prevalence rates.

Continuous variables were summarized by calculating means and standard deviations, and comparisons between groups were statistically tested using one-way analysis of variance and the resulting F-ratio statistic. Statistical significance between means was calculated using t-tests. Throughout, a statistical probability of a chance occurrence less than 0.05 was considered statistically significant.

It is important to note that some longitudinal analyses exclude a group of children examined at pretest who were diagnosed as having health problems requiring immediate medical care and subsequently were referred for follow-up services (and, if in the non-Head Start group, aided in getting that care). One hundred and three children with urgent medical problems were in the pretest sample (27%). Twenty-seven of these children were in need only of dental services. This group was not excluded from analyses reported here. The remaining 76 children had one or more health problem (often including dental needs) for which they were referred. They are excluded from some of the analyses.

At posttest, similar referrals were made for urgent medical and dental problems. Because treatment occurred after posttest data collection this group of children is included in all analyses. Table 3-1 in the Appendix identifies each of the children who were referred at pretest and describes the health problem(s) they were referred for. Similar data are provided about posttest children in Table 3-2.

Summary of Findings

Prevalence of Pediatric Problems

The prevalence of selected health problems identified in the pediatric evaluation at pretest is presented in Exhibit 3-2. These problems were selected because of their importance in terms of child health and because they appear to be more common than others in this sample of children. They included: serous otitis media, allergies, asthma, chronic illness,* enuresis (in children four years or older), recurrent otitis media, dermatologic problems,* surgical problems,* neurological problems (including seizures and febrile seizures),* psychosocial problems,* congenital cardiac problems,* urinary infections, acute otitis media, and congenital abnormalities.

Across the four sites, sixty percent of the children did not have any of the health problems noted above and could be considered "healthy." Prevalence of problems was highest in Greene and Humphreys Counties (47% of the children) and Maricopa County (45%) and lowest in Mingo County and St. Clair Counties where only one out of three children were diagnosed as having health problems. The most common problems that were found were serous otitis media, allergies and asthma.

The epidemology of pediatric problems is not well known in many instances as shown in Exhibit 3-3, for some pediatric health problems estimates (in some cases a range) of prevalence have been published; these provide a context for the prevalences determined from the Head Start Health Evaluation.

In all cases, this evaluation's estimates of prevalence were below published prevalences for most problems. This may be due to a number of factors. For example, the lower prevalence of recurrent otitis media (5 versus 33%) is probably due to differences in methodology; Teele et al. based their estimates on review of long-term medical records of children in pediatric care; Head Start evaluation estimates are based on mother's report. The very low estimates from the Head Start Health Evaluation are probably underestimates of the actual prevalences and suggest that a mother may not

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*Definitions of these problems are presented in Exhibit 3-2.

Exhibit 3-2

Prevalences of Selected Problems from the Pediatric Examination at Pretest

Selected Pediatric Problems		Pretested Children (Samples A and D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
Serous Otitis Media	n	10	5	11	8	34
	%	10.5	4.4	11.6	11.0	9.0
Allergies	n	17	7	5	0	29
	%	17.9	6.2	5.3	0.0	7.7
Asthma	n	5	9	5	3	22
	%	5.3	8.0	5.3	4.1	5.9
All Chronic Illness[a]	n	8	7	6	1	22
	%	8.4	6.2	6.3	1.4	5.9
Enuresis (4+ years old)	n	2/ 11	1/ 40	4/ 56	1/ 11	8/118
	%	18.2	0.7	7.1	9.1	6.8
Recurrent Otitis Media	n	3	10	2	4	19
	%	3.2	8.8	2.1	5.5	5.1
Dermatologic[b]	n	0	6	11	1	18
	%	0.0	5.3	11.6	1.4	4.8
Surgical Problems[c]	n	7	2	2	2	13
	%	7.4	1.8	2.1	2.7	3.5
Neurologic[d]	n	4	5	2	0	11
	%	4.2	4.4	2.1	0.0	2.9
Seizures	n	3	5	1	0	9
	%	3.2	4.4	1.1	0.0	2.4
Febrile Seizures	n	1	0	0	0	1
	%	1.1	0.0	0.0	0.0	0.0
Psychosocial[e]	n	2	6	4	0	12
	%	2.1	5.3	4.2	0.0	3.2
Congenital Cardiac[f]	n	3	1	4	1	9
	%	3.2	0.1	4.2	1.4	2.4
Urinary Infections	n	3	0	0	4	7
	%	3.2	0.0	0.0	5.5	1.9
Acute Otitis Media	n	2	0	2	1	5
	%	2.1	0.0	2.1	1.4	1.3
Congenital Anomalies	n	1	0	0	0	1
	%	1.1	0.0	0.0	0.0	0.0
No Problem (above)	n	50	75	52	49	226
	%	52.6	66.4	54.7	67.1	60.1

[a] All chronic illness: congenital cardiac, urogenital anomaly, hypospadias, seizures, neurological problems secondary to head trauma, febrile seizures, and sickle cell anemia.

[b] Dermatologic problems: eczema, seborrhea, nits, alopecea areata, impetigo, dry skin, and fungal infection.

[c] Surgical problems: inguinal hernias, undescended testes, umbilical hernias, and femoral hernias.

[d] Neurologic problems: seizures, febrile seizures, and neurologic problems secondary to head trauma.

[e] Psychosocial problems: breath holding, self-induced vomiting, hyperactivity, depressed mother, and undifferentiated psychosocial problems.

[f] Congenital cardiac problems: mostly murmurs, thought to be non-functional.

Exhibit 3-3

Estimated Prevalences of Pediatric Health Problems

Pediatric Health Problem	Estimated Prevalence with Source		
Recurrent Otitis Media	33%	Teele, Klein, Rosner	1980
Enuresis	10-20%	Leventhal	1975
Allergies	10-15%	Hoekelman	1978
	13.9%	Harvard School of Public Health	1981
Seizures	7%	Hoekelman	1978
Febrile seizures	2.5%	Hoekelman	1978
Asthma	3-4%	Haggerty, Roghmann, and Pless	1975
	5.4%	Harvard School of Public Health	1981
Congenital cardiac	0.8%	Vaughn and McKay	1978
	1.3%	Harvard School of Public Health	1981

know whether her child has had a history of ear infections because the child did not receive medical care during such an episode or the mother was not informed of the event. Another factor which may contribute to differences is that some published estimates are based on wider age ranges than those of the evaluation children, thereby describing health of children at ages when more problems might be expected. Among the three possibilities (methodology, lack of maternal medical knowledge, and ages reported) the second factor appears to be a major contributor to the differences between the Head Start Health Evaluation estimates and those of other studies.

According to classifications into which these problems were coded by a single pediatrician after the data collection, it is evident that problems are predominantly chronic, noninfectious, and of mild to moderate severity. Table 3-3 displays this information for pretest prevalences. These results are not surprising, because this evaluation focused on non-handicapped children.

The number of pediatric problems per child ranges from none to six at pretest as shown in Exhibit 3-4. Forty-seven percent of the children were found to have no health problems identified by the pediatric health evaluation. About one-third of the children had one problem and 14 percent had two. Boys tended to have more problems than girls in two sites (see Table 3-4 in the Appendix).

The child's health history at three periods (prenatal, perinatal, and childhood) was reviewed. According to the mother's reports, the health of approximately half the children was reported to be excellent or very good, as shown in Exhibit 3-5. The most common response by mothers in all sites was "good" or "very good;" whereas 10.8 percent reported their children's health to be "fair" or "poor." Such ratings were far more common in Mingo County than in the other three sites. Ratings of mothers were compared with assessments of the examining pediatricians showed high agreement as Tables 3-5 through 3-9 in the Appendix illustrate.

Exhibit 3-6 illustrates that an average of 31 percent of the mothers of children in the pretest sample delayed receiving prenatal care until after the first trimester. This is slightly higher than the national percentage of 26 who delay (National Center for Health Statistics, 1979). Furthermore 34 percent reported having health problems during pregnancy* and 35 percent gained more than 30 pounds or lost weight during pregnancy. There was some site variation in the prevalence of problems during pregnancy. Such problems seem to have been far more common in Mingo County than in the other three sites; mothers in Greene and Humphreys Counties, on the other hand, reported the lowest incidence.

Table 3-10 in the Appendix shows that 20 percent of the children were born to mothers who were less than 18 years of age, a situation which is considered to be a health risk to the child. The national average is 6 percent. Hence the proportion of teenaged mothers in the evaluation is more than three times higher than the national average.

Responses to items characterizing the perinatal health of the examined children are presented in Exhibit 3-7. The items distinguish children

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*These include fever, infection, high blood pressure, seizures, convulsions, vaginal bleeding, sugar in urine, diabetes, edema (less swelling, etc.), nerves/depression, and others.

Exhibit 3-4

Number of Health Problems at Pretest

Number of Problems		Pretested Children n=375
0	n	177
	%	47.2
1	n	128
	%	34.1
2	n	52
	%	13.9
3	n	11
	%	2.9
4	n	6
	%	1.6
5	n	0
	%	0.0
6	n	1
	%	0.3

Exhibit 3-5

Mother's Report of State of Child's Health for Pretested Children

State of Child's Health		Pretested Children (Samples A & D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=109	Maricopa County n=94	Mingo County n=73	All Sites n=371
Excellent	n	23	17	16	12	68
	%	24.2	15.6	17.0	16.4	18.3
Very Good	n	26	41	34	22	123
	%	27.4	37.6	36.2	30.1	33.2
Good	n	36	41	37	26	140
	%	37.9	37.6	39.4	35.6	37.7
Fair	n	9	10	5	12	36
	%	9.5	9.2	5.3	16.4	9.7
Poor	n	1	0	2	1	4
	%	1.1	0.0	2.1	1.4	1.1

Exhibit 3-6

Problems Reported During Pregnancy of Pretested Children

Maternal Health Indicators During Pregnancy		Pretested Children (Samples A & D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
First prenatal visit more than three months	n %	20/ 84 23.8	28/107 2.62	32/ 93 34.4	29/ 69 42.0	109/353 30.9
Health problems during pregnancy (other than weight gain)	n %	25/ 88 28.4	38/107 35.5	30/ 92 32.6	29/ 70 41.4	122/357 34.2
Pregnancy weight loss or gain of more than 30 lbs.	n %	13/ 62 21.0	28/100 28.0	36/ 79 45.6	30/ 64 46.9	107/305 35.1

Exhibit 3-7

Children with Perinatal Problems at Pretest

Perinatal Health Problems		Pretested Children (Samples A & D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
Gestation less than 38 weeks or greater than 42 weeks	n %	5/ 89 5.6	22/109 20.2	16/ 91 17.6	6/ 71 8.5	49/360 13.6
Birthweight less than 5.5 pounds or greater than 10 pounds	n %	7/ 80 7.9	17/108 15.7	11/ 92 12.0	3/ 68 4.4	38/357 10.6
Hospital stay at birth longer than mother's	n %	2/ 91 2.2	14/107 13.1	14/ 93 15.1	7/ 71 9.9	37/362 10.2
Health problems at birth	n %	25/ 88 28.4	38/107 35.5	30/ 92 32.6	29/ 70 41.4	122/357 34.2
Congenital problems	n %	11/ 93 11.8	18/108 16.7	12/ 92 13.0	16/ 72 22.2	57/365 15.6

who were at risk at birth (gestational age, birth weight) and children who experienced health-related problems in the neonatal period (hospital stay, health problems, congenital problems). Based on these data, the children in Greene and Humphreys Counties, according to mother's reports, generally were healthier perinatally than children in the other sites. Moreover, few of the children participating in the evaluation appear to be "at risk" from perinatal factors.

Exhibit 3-8 presents the percentage of children reported to have had serious accidents, according to type of accident. Unlike national statistics on children's accidents based on emergency room records, no attempt was made to collect information on the cause of the accident (e.g., of a poisoning incident.) Across the four sites one out of three children had been involved in any type of accident. Lacerations and swallowing of poison were the most common types of accidents being highest in Maricopa County and lowest in Greene and Humphreys Counties (both in terms of the proportion of children who had had accidents and the average number of accidents per child).

Health Services Provided through Head Start

The Head Start Performance Standards and the amendment of January 4, 1980, "Interpretation of Health Performance Standards as related to Periodic Provision of Medical Screening Services," are fairly specific about what Head Start requires in the medical services or health component, including their periodicity. The services are shown in Exhibit 3-9.

To document services obtained by Head Start children, three items from the Head Start health abstracts were utilized: (1) having a physical exam before or during the Head Start year, (2) having a health record, and (3) having documentation of a child's prior immunization status.*

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*The immunization data, as abstracted, could not be used to determine whether the child had completed all immunizations. Consequently for that variable it had to be assumed that, if there was any immunization information, this requirement was satisfied. It is likely that such a definition overestimates the number of children for whom complete immunization records were in the possession of Head Start.

Exhibit 3-8

Percentage of Head Start-Eligible Children Reported to Have Had Serious Accidents

Type of Accident	Pretested Children (Samples A & D) in:				
	Greene & Humphreys Counties n=95	St. Clair County n=110	Maricopa County n=95	Mingo County n=73	All Sites n=376
Any	22.1	36.4	43.2	39.7	35.1
Broken Bone	2.1	3.5	3.2	2.7	2.7
Burn	3.2	6.2	4.2	5.5	4.8
Laceration	8.4	12.4	22.1	9.6	13.3
Swallow poison	7.4	6.2	10.5	11.0	8.5
Loss of consciousness	2.1	2.7	5.3	1.4	2.9
Other	5.3	15.9	22.1	17.8	15.2
Mean Number of Accidents Per Child	0.3	0.6	0.9	0.6	0.6
Standard Deviation	0.6	0.9	1.7	0.9	—

Exhibit 3-9

Medical Services Required by Head Start

Required Medical Services	When Required
Health History, including copy of immunization record	Beginning of operating period.
Physical examination/assessment	Every two years beginning age 3
Immunization against seven diseases	By end of operating period as required
Tuberculin testing	As required
Additional screening for other health factors e.g. lead poisoning, parasites, sickle cell anemia	As required
Growth assessment	Beginning and end of operating period
Hemoglobin or hematocrit	During first year
Hearing test	Every two years beginning age three
Vision testing for visual acuity and strabismus	Every two years beginning at age three

Exhibit 3-10 presents the percentages of Head Start children examined at posttest who had received the desired health services. Overall, there was moderate compliance with the Head Start performance standards. Eighty-five percent of the children had received a physical exam before or after entering Head Start and 77 percent of the children had received immunizations.

There was considerable site variation in receipt of these services. Maricopa County arranged for physical examination for all Head Start children

Exhibit 3-10

Health Services Delivered to Head Start Children during the Year in Program

Health Services		Posttested Children (Samples A, B, C) in:				
		Greene & Humphreys n=127	St. Clair n=108	Maricopa n=102	Mingo n=112	All Sites n=449
Information Present in:						
Information Present in Health Record	n %	127 100	108 100	102 100	85[a] 75.9	422 94.0
Physical Exam After Entry	n %	94 74.0	4 3.7	97 95.1	82 96.5	277 65.6
Before or After Entry	n %	94 74.0	102 94.4	102 100	83 74.1	381 84.9
Previous Immunization[b]	n %	116 91.3	92 85.2	101 99.0	35 31.3	344 76.6

[a] Only 85 Head Start children had a health record on file.

[b] This variable indicates some documentation of immunization status, completion of all immunizations during the year in Head Start.

and the majority had an immunization record. In terms of the proportion of children who had received physical exams, Greene and Humphreys Counties and Mingo County scored lowest.

These site variations reflect local Head Start policies regarding delivery of health services. According to the reports of the Head Start directors and the health coordinators, the delivery of medical screens and services is conducted differently in each of the four sites. Exhibit 3-11 summarizes some of the characteristics of the methods each Head Start program uses to conduct medical screens and referrals for treatment according to whether the child is Medicaid-eligible. One of the Head Start grantees relies heavily on Medicaid assistance in delivery of medical screening and treatment. In St. Clair County the children go to private pediatric practices or primary care clinics (frequently located in their public housing projects).

The other sites pay directly for most of the screens and examinations. There is no Medicaid in Maricopa County (and therefore no EPSDT) and all health services are purchased by contract with the Health Department. Maricopa County's record of service delivery to the children is outstanding (100% received medical examinations and 99 percent had immunization records). In Mingo County, although some children are Medicaid-eligible (EPSDT-eligible) none of the physicians will accept the level of reimbursement offered. Consequently, Head Start pays directly for the screens and examinations. Any findings from these, however, are simply called to the parent's attention. Unless the child is EPSDT-eligible or the parent pays directly for the necessary treatment, no treatment is provided. This is the only site with nearly 25 percent of the health records missing and with immunization records on only 31 percent of the children.

Another major policy difference among sites is that, with the exception of St. Clair County, all medical screens are performed after entry into Head Start. In that site a physical examination is required with the Head Start application and all medical screens are paid for by other means, usually EPSDT.*

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*Referred to locally as IDPA (Illinois Department of Public Assistance).

Exhibit 3-11

Characteristics of the Head Start's Delivery of Medical Examinations and Services in Each of the Sites

Characteristic and EPSDT Eligibility	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Time of the screen	before mid December	prior to entry	as soon as possible	as soon as possible
Non-EPSDT children				
Who performs screen	Pediatrician Nurse Pract.		Pediatrician	Pediatrician
Where performed	Head Start		Health Dept.	Private Off.
Cost per child	$12	(parent pays)	$165[a]	$8
EPSDT children				
Who performs screen	Nurse Pract.	Pediatrician		
Where performed	Health Dept.	Private Off.		
No Cost to Head Start				
If finding, method of referral and follow-up	Head Start helps parent to follow-up	Head Start follow-up	Health Dept. follow-up	Head Start tells parent
Average cost for treatment	$150	All EPSDT	Included in cost above	Head Start does not pay

[a] Contract with Health Department is similar to an HMO arrangement. This cost per child covers all medical, dental, vision and hearing screening and treatment.

Head Start children receive other preventive health services beside screening tests. Exhibit 3-12 presents frequencies of Head Start children at posttest who have received tuberculosis testing, immunizations in the past year, and blood tests for lead toxicity. The Head Start Performance Standards state that certain specific tests may be indicated in areas or in groups of children at particular sites. The preventive screens for lead and tuberculosis fall into this category. The data show that a significant number of children in each site is at risk for tuberculosis due to exposure to someone known to have this disease. Nationwide, in this age range, reported cases of tuberculosis have an incidence from 0.5 to 0.9 percent (CDC, 1980). In three sites, over 75 percent of the children were tested for tuberculosis; in Greene and Humphreys Counties only 18 percent of the children had received a TB test. St. Clair County is the only site in which appreciable testing for lead toxicity was conducted. This is consistent with the fact that children in older urban environments are most at risk for lead poisoning, resulting from the prevalence of lead paint in dwellings and high levels of lead-containing automobile exhaust fumes.

Based on findings at pretest, a total of 34 Head Start children (2 in Greene and Humphreys Counties and 2 in St. Clair County) were referred for lead tests. Because these referrals may be viewed as an intervention, the referred children were excluded and the proportions of children tested were recalculated. Adjusted proportions are presented in the bottom row of Exhibit 3-12.

Over half of the children received immunizations during the Head Start year. Forty-nine percent of this group of children had received the immunization through Head Start. This practice was most common in Head Start programs in Maricopa and Mingo Counties.

As noted in Exhibit 3-9, Head Start is mandated to arrange for a number of other screens for enrolled children: growth assessments, hemoglobin or hematocrit, vision and hearing. These screens are addressed in separate chapters of this report (Chapter Five: Anthropometry; Chapter Seven: Hematology; Chapter Ten: Vision; Chapter Eleven: Hearing).

In addition to health screening and preventive services, Head Start provides help to families to obtain medical treatment for problems in some situations. As shown in Exhibit 3-13, over half of the children had received

Exhibit 3-12

Preventive Services Received by Head Start Children

Preventive Services		Posttested Children (Samples A, B and C) in:				
		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=106	Mingo County n=119	All Sites n=460
TB exposure	n %	3/127 2.4	6/108 5.6	14/105 13.3	3/118 2.5	26/458 5.7
TB test	n %	18/101 17.8	81/ 97 83.5	75/ 96 78.1	94/106 88.7	268/400 67.0
Immunization in past year	n %	63/123 51.2	75/107 70.1	68/103 66.0	51/117 43.6	257/450 57.1
Immunization through Head Start	n %	22/ 63 34.9	12/ 72 16.7	50/ 67 74.6	40/ 50 80.0	124/252 49.2
Lead Test	n %	3/123 2.4	61/101 60.4	0 0.0	0 0.0	64/440 14.5
Excluding referrals at pretest for lead test	n %	1/120 0.9	59/ 96 61.5	0 0.0	0 0.0	60/432 13.9

[a] Percentages based on those reporting having received immunizations in the previous year.

treatment for illness since they entered Head Start. Only one out of five children, however, had received treatment through Head Start. This was more common in Mingo County than in the other three sites, according to mother's reports.

Health Services Provided Through Other Sources

A wide range of resources are available to serve the medical needs of low-income children. Since Head Start in most cases does not do medical

Exhibit 3-13

Treatment for Illness in the Past Year Received by Head Start Children

Treatment Service		Posttested Children (Samples A, B, C) in:				
		Greene & Humphreys Counties n=126	St. Clair County n=100	Maricopa County n=101	Mingo County n=110	All Sites n=437
Received Treatment	n	66	54	57	70	247
	%	52.4	54.0	56.4	63.6	56.5
Through Head Start	n	7/ 51	1/ 51	4/ 47	32/ 67	44/217
	%	13.5	2.0	8.5	47.8	20.3

screens or provide medical treatment directly but rather refers to private physicians or health care organizations, the same resources are used by Head Start and non-Head Start children.

We investigated what sources were used by low-income families to meet their health needs. All but 10 percent of the mothers could identify where they usually receive medical care. There was some variation among sites, ranging from 15 percent of the mothers in Maricopa County not having a usual source of medical care to only one percent in St. Clair County.

As is shown in Tables 3-11 through 3-13 in the Appendix, the majority of the children received checkups either from a pediatrician (43%) or a general practitioner (43%). There was some variation from site to site, with the majority of children in St. Clair and Mingo Counties receiving medical services from a pediatrician; in the other two sites it was more typical for children to be examined or treated by a general practitioner. With regard to immunizations, the pattern is somewhat different with more children receiving shots from either a nurse/nurse practitioner (34%) or a pediatrician (34%). Only in Maricopa do most children receive immunizations from a general practitioner.

In addition, data were collected about the location of the medical services. Site variations again were evident. Medical care is provided most commonly in a private physician's office in St. Clair and Greene and Humphreys Counties. Use of community clinics for checkups, treatment and immunizations is most common in Maricopa County. Families in Mingo County, on the other hand, used hospital clinics more often than other locations for checkups and treatment. Immunizations in two sites most often were provided to the majority of children by the Health Department. The most common sources of medical care are summarized in Exhibit 3-14.

Impacts of Head Start's Health Services on Children

Longitudinal Analyses. The longitudinal sample allows us to assess change in the problems within the constraints of sample size. The prevalence of pediatric problems at pretest was low as discussed earlier (see Exhibit 3-2). None of the changes in prevalence of problems from pretest to posttest are significantly different from zero, and changes did not differ significantly between the Head Start and non-Head Start group of children. These findings are not surprising for several reasons. First, most of the pediatric problems identified are chronic in nature, so that little change can be expected over time. Second, the prevalences of these problems and their observed changes are small relative to the number of children in the sample, so that it is difficult to detect any true change. Finally, because of the low observed prevalences, few changes in prevalence and the relatively small sample sizes, even small observer errors in diagnosis may obscure "true" changes.

Next, we examined whether differences existed between the Head Start and non-Head Start groups in the proportion of children diagnosed as having problems both at pretest and posttest. Two sets of analyses were undertaken --one excluding children referred for medical care at pretest; the other including all children regardless of pretest referrals. These two sets of analyses produced almost identical results, as shown in Table 3-14 in the Appendix. Across the four sites, the proportion of children with health problems at both pre- and posttest was significantly lower (by 23%) for the Head Start group, suggesting a positive Head Start impact when the sample includes the children referred for treatment by evaluation's physician(s).*

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*Table 3-15 provides more detailed information about the specific health problems children were diagnosed to have at pretest and the absence or presence of these problems at posttest for Head Start and non-Head Start children by site. This table cannot be used to count children, however.

Exhibit 3-14

Most Common Uses of Health Care Sources of Low-Income Families

	Greene & Humprheys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Medical Providers					
Checkups	GP	Pediatrician	GP	Pediatrician	Pediatrician/GP
Treatment	GP	Pediatrician	GP	Pediatrician	GP
Immunizations	Nurse/Nurse practitioner	Pediatrician	GP	Nurse/Nurse practitioner	Nurse/Nurse practitioner o Pediatrician
Location of Services					
Checkups	Private Doctor Office	Private Doctor Office	Community Clinic	Hospital Clinic	Private Doctor Office
Treatment	Private Doctor Office	Private Doctor Office	Community Clinic	Hospital Clinic	Private Doctor Office
Immunizations	Health Department	Private Doctor Office	Community Clinic	Health Department	Health Department

Otherwise, the Head Start program in Green and Humphreys Counties showed a significant impact on the health problems found at pretest, irrespective of a referral by the evaluation's pediatrician. On closer examination of group differences in each of the sites, Head Start shows a lower prevalence of continuing problems at both time points in Maricopa County as well. This trend is reflected across all sites, as Exhibit 3-15 illustrates.

The group difference in Greene and Humphreys Counties is primarily due to Head Start's use of health resources in this site. Despite moderate compliance with performance standards (as noted earlier) after the evaluation provided each program with a complete summary of the pretest findings on each child, this program responded. As Exhibit 3-16 suggests, Head Start intervention in this site was instrumental in getting children treated for health problems that were identified by the examining physician at pretest. A significantly greater proportion of the Head Start than non-Head Start children had received treatment for problems.* A similar trend was evident in Maricopa and Mingo Counties, but the group differences were not statistically significant. What this appears to indicate is that children in these two sites received treatment for medical problems whether or not they are enrolled in Head Start. This was not the case in Greene and Humphreys Counties where only a very small proportion of the non-Head Start children received follow-up care. Only in St. Clair County did children in the non-Head Start group fare better than Head Start children, although the group difference was not statistically significant.

We further examined whether children with multiple problems were more likely to have received treatment than those with only a single problem. Results (presented in Table 3-17 in the Appendix) suggest that this is not the case, at least for the Head Start children (approximately 44% in both the single and multiple problem group received treatment). The situation was different for the non-Head Start children who were more likely to have been treated if they had multiple problems (42%) than children with a single health problem (22%). The trend was not consistent across all four sites, however.

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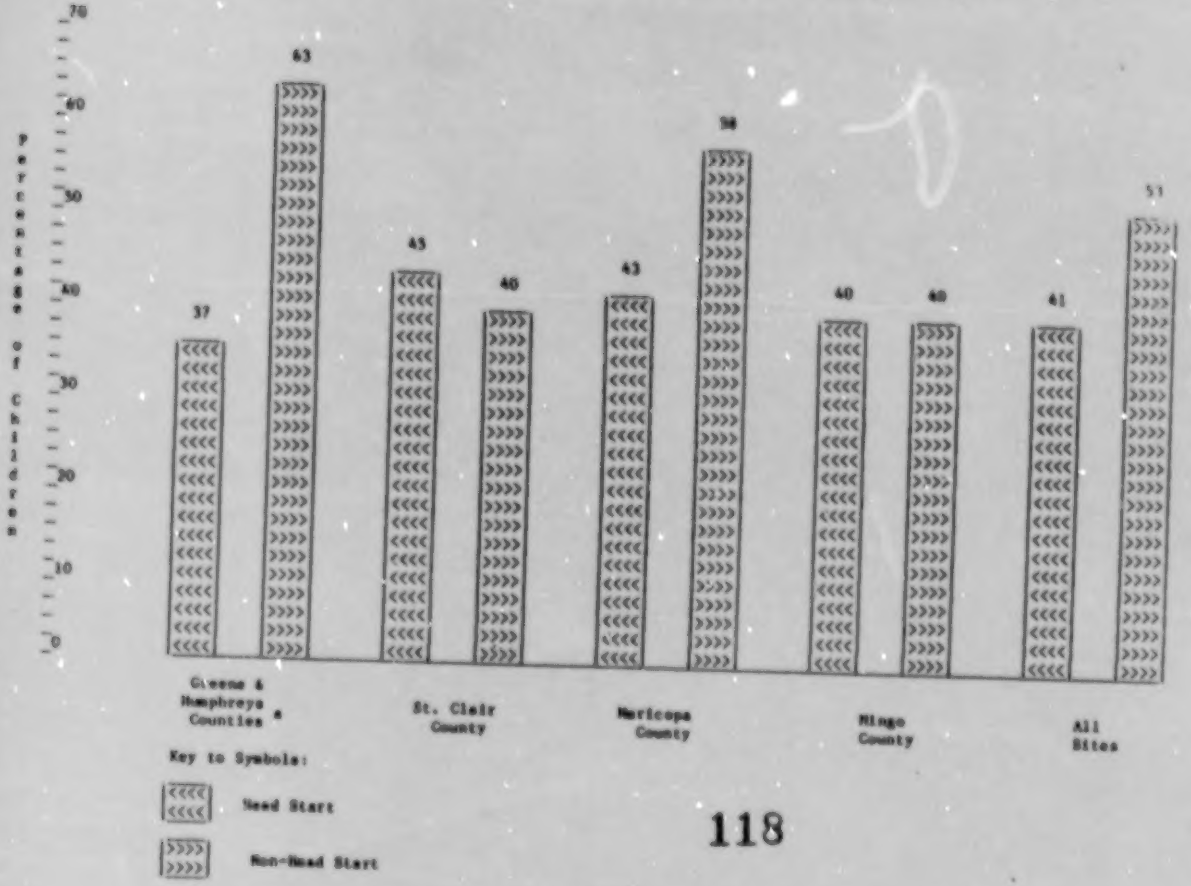
*Analyses were done on all children, as well as on the group that was not referred for medical services by the examining physician at pretest. These two analyses produced identical results, as shown in Table 3-16.

Exhibit 3-15

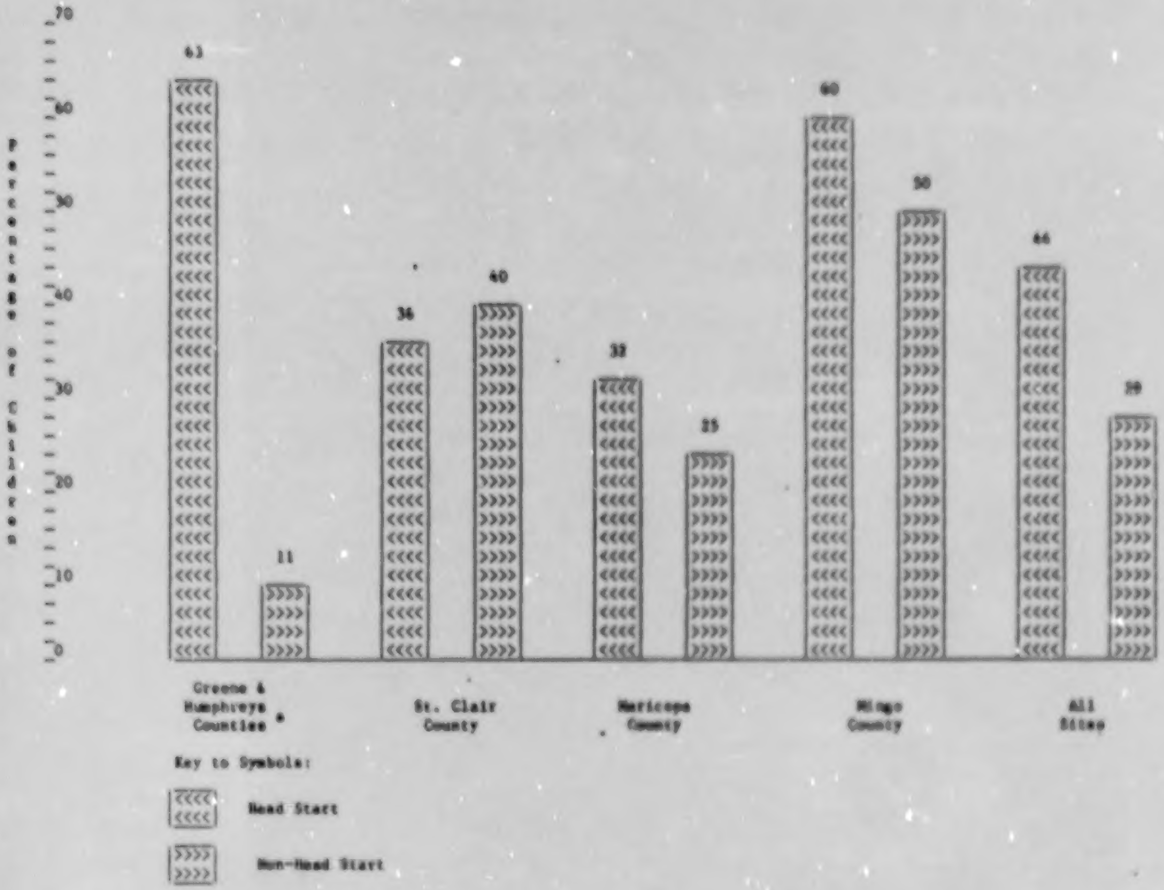
Children with Problems at Both Pretest and Posttest for Head Start and Non-Head Start Children in the Longitudinal Sample



ª Difference between Head Start and non-Head Start groups is statistically significant $p < .05$.

Exhibit 3-16

Children with Problems at Both Pretest Who Received Treatment for At Least One Problem Prior to Posttest for Head Start and Non-Head Start Children in the Longitudinal Sample



* Difference between Head Start and non-Head Start groups is statistically significant $p < .05$.

Mothers of Head Start children were asked whether treatment had been obtained through Head Start. Data were collected on only 25 of the treated children. It is unclear whether the large amount of missing data for this item reflects uncertainty on the part of mothers, or oversight on the part of the recording pediatrician. While the exact nature of Head Start involvement is unknown for these cases, it is the mothers' perception that was recorded. The percentage of Head Start children treated for a pretest pediatric problem for whom it was indicated there was Head Start involvement in these treatments ranged from zero (n=4) in St. Clair County to 80 percent (n=10) in Greene and Humphreys Counties. Across all the sites the average is 48 percent (n=25), including 25 percent in Maricopa County (n=8) and 67 percent in Mingo County (n=3). Head Start involvement was reported for all sites except St. Clair County.

There also appear to be group differences in the proportion of children who received a physical exam in the previous year. Across all sites, 85 percent of the Head Start children compared to 71 percent of the non-Head Start children had received a checkup. The group difference was largest in Mingo County where physical examinations had been done on 81 percent of the Head Start and only 59 percent of the non-Head Start children.

Finally, we examined whether Head Start had been instrumental in informing families about Medicaid and assisting them in the enrollment process. There was practically no change in Medicaid coverage from pretest to posttest in either the Head Start or non-Head Start group. As shown in Exhibit 3-17, Medicaid use is low (or in the case of Maricopa County, nonexistent) for both groups in all sites except St. Clair County. This finding is surprising because most families appear to meet Medicaid eligibility requirements in terms of income (as illustrated in Table 3-18 in the Appendix). There was, in fact, a slight decrease in Medicaid coverage from pretest to posttest, which may be due to recent cutbacks in social programs. Only Greene and Humphreys Counties showed an increase in the proportion of families with Medicaid coverage, but only for the Head Start group, suggesting the presence of a possible Head Start effect. (The group difference was not statistically significant, however, probably due to small sample sizes.) It is clear that Head Start effectiveness could be improved in this regard.

Cross-sectional Analyses. A series of analyses were conducted using the cross-sectional sample of children (Samples A, B, and C). Important

Exhibit 3-17

Medicaid Coverage of Head Start and Non-Head Start Families by Site[a]

Groups of Families		Pretest (Sample A) Children in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start at Pretest	n	17/ 43	22/ 25	0/ 39	8/ 18	47/125
	%	39.5	88.0	0.0	44.4	37.6
Head Start at Posttest	n	24/ 43	15/ 25	0/ 40	6/ 18	45/126
	%	55.8	60.0	0.0	33.3	35.7
Non-Head Start at Pretest	n	14/ 31	14/ 17	0/ 16	6/ 18	34/ 82
	%	45.2	82.4	0.0	33.3	41.5
Non-Head Start at Posttest	n	13/ 31	13/ 17	0/16	4/ 17	30/ 81
	%	41.9	76.5	0.0	23.5	37.0

[a] Group differences are not statistically significant.

health characteristics of the Head Start and non-Head Start groups in the cross-sectional sample are presented in Tables 3-19 through 3-27 in the Appendix. No significant differences in prevalence rates were found between the pretest and posttest sample, suggesting that our estimates are realistic for low-income children in the four study sites. Similar analyses comparing the posttest sample groups (Head Start and non-Head Start) in terms of prenatal and perinatal problems and incidence of accidents and hospitalizations showed no significant group differences in any of the sites.

Finally, we assessed whether there is evidence of a Head Start effect in terms of preventive health care provision. In all four sites Head Start was instrumental in getting children examined (see Exhibit 3-18). Within sites, group differences were statistically significant only in Maricopa and Mingo Counties.

Across the four sites, 86 percent of the Head Start children had received their physical exam through Head Start. There was some site varia-

Exhibit 3-18

Physical Examination Received by Children in Past Year

Groups of Families		Posttested Children (Samples A,B,C) in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n	83/100	94/105	86/103	99/114	362/422
	%	75.5	89.5	83.5	86.8	85.5
Non-Head Start	n	61/ 91	69/ 83	30/ 57	68/105	228/336
	%	67.0	83.1	52.6	64.8	67.9
Significance	n	0.19	0.20	<.02	<.01	<.01

tion in the proportion of children being examined through Head Start, ranging from all children in Maricopa County to three out of four in Mingo County.

In terms of other preventive health services--tests for tuberculosis and lead poisoning, and immunizations--Head Start children were more likely to have received them than non-Head Start children. As Exhibit 3-19 illustrates, evidence of a statistically significant Head Start impact was found across all four sites on all three measures. (Note, however, that lead testing occurred in only two sites--Greene and Humphreys Counties and St. Cliar County.) Within-site analyses showed up some significant group differences--particularly in Mingo County (where Head Start children fared considerably better than non-Head Start children with regard to receipt of TB tests and immunizations) and St. Clair County (on all three preventive health services). No statistically significant group differences were found in Greene and Humphreys Counties and only one Head Start effect (TB test) was evident in Maricopa County.

A positive Head Start effect could not be demonstrated in terms of treatment for illness (See Exhibit 3-20). This may indicate that although Head Start children are more likely to receive physical examinations and other preventive health services, they are no more likely to need and accept medical care for illness. Parents of both the Head Start and non-Head Start children are equally likely to find medical help for a sick child.

Exhibit 3-19

Other Preventive Health Services Received by Children in Previous Year[a]

Preventive Services	Posttested Children (Sample A, B, C) in:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS (n=127)	NHS (n=101)	HS (n=108)	NHS (n=86)	HS (n=106)	NHS (n=61)	HS (n=119)	NHS (n=109)	HS (n=460)	NHS (n=357)
TB exposure	3/127 2.4	3/97 3.1	6/108 5.6	1/85 1.2	14/105 13.3	3/59 5.1	3/118 2.5	10/108 9.3*	26/458 5.7	17/357 4.9
TB Test	18/101 17.8	16/83 19.3	81/ 97 83.5	42/74 56.8***	75/ 96 78.1	29/56 51.8***	94/106 88.7	45/100 45.0***	268/400 67.0	132/313 42.2***
Any Immunizations in Past Year	63/123 51.2	42/97 43.3	75/107 70.1	48/85 56.5*	68/103 66.0	31/60 51.7	51/117 43.6	25/108 23.1**	257/450 57.1	146/350 41.7***
Lead Test	3/123 2.4	1/97 1.0	61/101 60.4	27/73 37.0**	0	0	0	0	64/440 14.5	28/337 8.3**
Excluding referrals at pretest for lead test	1/120 0.9	1/97 1.0	59/ 96 61.5	24/68 35.3***	0	0	0	0	60/432 13.9	25/332 7.5**

[a] Significance indicated as:

* $p < .05$
** $p < .01$
*** $p < .001$

Exhibit 3-20

Treatment for Illness Received in the Past Year[a]

Groups of Families		Posttested Children (Sample A, B, C) in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n	66/126	54/100	57/101	70/110	247/437
	%	52.4	54.0	56.4	63.6	56.5
Non-Head Start	n	54/ 97	44/ 81	30/ 59	72/ 97	200/334
	%	55.7	54.3	50.8	74.2	59.9

[a] None of the group differences are statistically significant.

Finally, we examined whether Head Start's health services were more effective for special groups of children. The results of these analyses are shown in Appendix Tables 3-28 through 3-37. In general, there were few differences among children who did or did not receive needed services. Children of mothers with less than 12 years of education and those with no Medicaid were less likely to have findings reported on the basis of the health screen. This last result may suggest underreporting of findings if the child is not eligible for EPSDT.

Conclusions

The results indicate that the children in both the Head Start and non-Head Start groups are three times as likely to be born to a teenage mother as children in the general population. Despite these beginnings, a substantial proportion of the children are considered "healthy." Of the children not deemed to be in good health, many have chronic, non-infectious problems of mild to moderate severity.

There is considerable variation in the Head Start service delivery policies within sites. One made effective use of Medicaid, another, the local health department. Two others were forced to purchase screening services directly for all children and had limited funds available for

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treatments. Head Start had a positive effect with regard to provision of preventive health services. This is especially true in the improved rates of immunizations.

Although there is a significant Head Start effect in only one site on the delivery of treatment for specific problems which were identified at pretest by the examining physician, it does appear that in all sites but one Head Start made a positive effort to treat problems. This is evident in two of the four sites, where a smaller percentage of Head Start children retained a problem found at pretest. Head Start intervention was particularly important in sites where access to medical services is limited for low-income children.

Data suggest that the presence of Medicaid or a contract for services from a health department is an essential element in the delivery of medical services from screening and examinations through treatment. It is therefore unclear why more emphasis is not being placed by Head Start on increasing the proportions of children who receive EPSDT services—one of potential mechanism for increasing services to children. Head Start effectiveness in this regard could be enhanced substantially.

CHAPTER FOUR

DENTAL EVALUATION

Dental Health Indicators

The prevalence of caries has declined considerably in the past 10 years among American children. In a recent survey of 40,000 children, 95 percent of all five-year olds were caries-free. Community fluoridation of water, alternative fluoridation regimes, and pit and fissure sealants appear to be three contributing factors to the improvements in the dental health of children (Brunelle, 1982). Dental health remains a major public health issue within the adult population. If low-income children do not have access to fluoridation and do not receive proper care of their teeth, they will face serious dental health problems later in life. According to the results of the First National Health and Nutrition Examination Survey, 10 percent of adults aged 18 to 44 had lost all of their teeth from one or both jaws and 4 percent had no remaining teeth. This survey also found evidence of decay in teeth of children under five years of age. On average, 16 percent of children aged one to five needed dental treatment for decay and had one decayed or filled primary tooth. However, most of the primary teeth remained unfilled (U.S. Department of Health and Human Services, 1981a).

Although no evidence indicates that low-income children are more at risk for dental decay than high-income children, there is evidence that family income may be related to whether children receive fillings. Dental health is a product of the child's overall health, nutrition, and health care context. Treatment and preventive dental services are components of the health care system that vary in their availability and accessibility to the Head Start-eligible population. For example, some communities provide fluoridation of water as a service to all residents. This is clearly beneficial in reducing caries development. Dental hygiene practices for very young children are those of the child's family and its social context. The family determines the acceptability of thumb sucking and the age at which it is discouraged. Similarly, nutrition and feeding habits within the family have ramifications for dental health. Both the consumption of sweet, sugared foods and the practice of permitting a child to fall asleep with a bottle of sweet or carbohydrate liquid may result in serious dental problems.

The dental evaluation was designed to determine the impact of Head Start dental services on children, and to assess whether Head Start children exhibit better dental health than non-Head Start children. Dental health indicators observable in the evaluation are:

- Cleanliness and health of the children's teeth;
- Overall incidence of treatment needs; and
- Identified treatment needs that have been met.

The dental evaluation consisted of a direct examination performed by a pedodontist trained at Boston's Children's Hospital and a dental history interview administered to the child's mother or guardian. During the dental examination, the pedodontist charted carious lesions and fillings on each surface and recorded evidence of gingival inflammation and occlusion abnormalities.

The analysis of the dental evaluation aimed to answer four major research questions:

- What is the prevalence of decay and restorations, hygiene and occlusion measures, and needs for treatment of dental problems among the Head Start and non-Head Start children?
- What dental screening and treatment services has Head Start provided to Head Start children?
- Do children receive dental services through sources other than Head Start?
- What is the impact on Head Start children of dental services, in terms of the dental health status and receipt of services compared with non-Head Start children?

The dental health indicators used in the analyses are defined in Exhibits 4-1 and 4-2. They include both prevalence measures and incidence measures. Prevalence measures are indicators of dental events at particular times. With two time points, the pretest and posttest, a set of incidence measures can be created. These capture the development of caries and receipt of fillings in the year between pretest and posttest examinations; measurement of incidence is thus confined to the sample of children participating in both examinations (Sample A). Incidence measures are of interest because

Exhibit 4-1

Definitions of Variables Used in Dental Evaluation

Surface Variables	Definition
	The five sides of a tooth above the gum line, the buccal surface is toward the cheek, the lingual toward the tongue, the mesial toward the chin and distal toward the jaw. The occlusal is the biting surface. Variable Construction. The variables summarizing affected surfaces were constructed by counting the number of surfaces observed to be carious, filled, or missing among the 120 surfaces a child may have in 24 teeth. Counts of total numbers are termed the prevalence variables. Comparably, surfaces are enumerated to set change status flags for the incidence variables. Percent equivalents of these measures have been created by dividing these counts by the total number of surfaces observed. However, in the case of percent measures of missing surfaces, the denominator equals the number of surfaces observed plus the number which are missing.
Prevalence Variables	Counts of total numbers of decayed, filled or missing surfaces are termed the prevalence variables.
Decayed surfaces	Surfaces with unrestored carious lesions (may also have restorations).
Filled surfaces	Surfaces with restored carious lesions (may also have unrestored lesions).
Missing surfaces	Surfaces on a tooth which is missing, presumably as a result of a trauma or extraction. Note that of the 98 children in the pretest and posttest samples with missing teeth, 14 had a tooth possibly missing due to natural processes. This possibility has been identified by a consulting clinician familiar with the normative patterns of exfoliation and eruption. However, the tooth was scored by examining pedodontist as missing, and the possibility of extraction or trauma cannot be ruled out.
Decayed and Filled Teeth	The sum of decayed and filled teeth. In general, lower df is a sign of better dental health (fewer decayed and/or filled teeth) than a higher df.
Incidence Variables	The difference between the numbers of decayed, filled or missing surfaces at pretest and at posttest is the incidence variable.
Incidence of decay	Unrestored caries observed at posttest in surfaces which were sound or restored at the pretest.
Incidence of fillings	Restorations observed at posttest in surfaces which were sound or decayed at the pretest.
Incidence of missing surfaces	Surfaces of teeth which were observed to be missing at posttest but were present at pretest.
Occlusion Variables	
Classification of profile	An appraisal of the conformation of the profile from the bridge of the nose to the jawbone. Scored as straight (orthognathic), convex (retrognathic), or concave (prognathic).
Primary occlusion[a]	[illegible] relationship of the upper and lower primary molars, assessed at the second first degree molars, [illegible] scored according to whether the back (distal) surface of the lower molar is forward or mesial in relation to the upper molar, or is behind or distal to the back (distal) surface of the upper molar.
Occlusion Variables (continued)	Definition
Overbite	Percent of the lower incisor covered by the upper when the teeth are closed naturally.
Openbite	When the teeth are closed naturally, open bite is present if the upper incisors are above the lower incisors.
Overjet	The horizontal distance between the incisors (i.e., the extent to which the teeth are protrusive or retrusive in the horizontal plane).
Crossbite	Relationship of the posterior teeth; observed when an upper molar is oriented toward the lingual (tongue) or buccal (cheek) side of the lower teeth, rather than in the normal cusp to fossa relationship.
Gingival Inflammation	Inflammation of the papillary, marginal and attached gingiva of each tooth. Careful evaluation of the data collected in the posttest suggests that in two of the sites, the scoring of inflammation was not sufficiently reliable to permit further analysis.
Oral Hygiene Index[a]	Average of the plaque scores obtained for the buccal and lingual surfaces of a sample of six teeth. Plaque was scored from 0 (indicating no plaque) to 3 (indicating plaque extending to the middle third of the tooth).
Treatment Needs	Urgent or routine needs for treatment based on clinical evaluation of oral hygiene-presence of debris and calculus, decayed teeth, gingival inflammation and unacceptable occlusion.

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[a] See Exhibit 4-2 for drawings that elucidate dental terminology used in this chapter.

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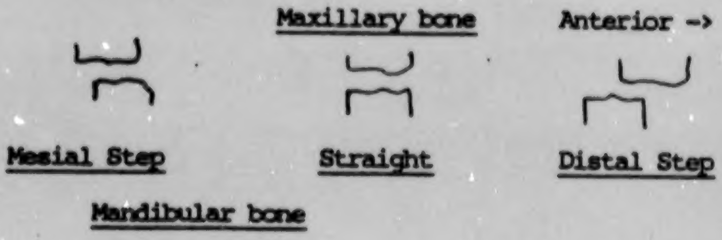
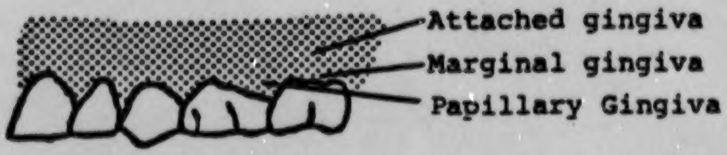
Exhibit 4-2

Dental Terminology

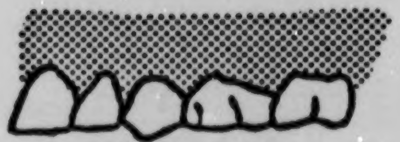
Primary Occlusion


Maxillary bone
Anterior ->
Mesial Step
Straight
Distal Step
Mandibular bone

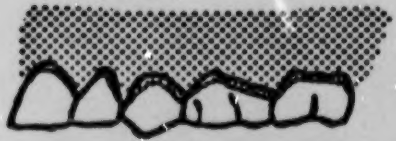
Gingiva (gum)


Attached gingiva
Marginal gingiva
Papillary Gingiva

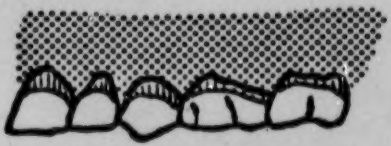
Oral Hygiene Index Scoring System [a]



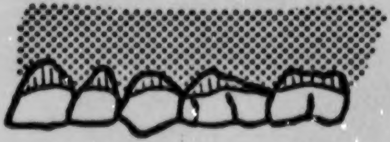
0-no plaque



1-plaque limited to the gingival line



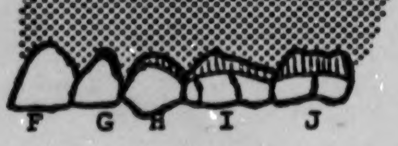
2-plaque to the gingival third



3-plaque to the middle third of tooth

▥ Plaque

Oral Hygiene Score Calculation



F=0 H=2 J=3

G=1 I=3

(F+G+H+I+J)/5=1.8

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[a] Oral hygiene scores were obtained in this manner on a sample of six teeth. One half the upper arch was used in this example to illustrate the calculation.

Head Start dental education and treatment services may be hypothesized to lower the incidence of decay and may increase the frequency with which carious teeth are restored.

Analysis of Dental Data

The dental evaluation employed variables requiring the use of different analytic and statistical procedures. The major measures were of two kinds: (1) the oral hygiene index and (2) measures of surfaces, in which each surface was scored as carious, restored or missing, including number of decayed surfaces and number of filled surfaces.

The oral hygiene index is a continuous measure of average plaque, ranging from 0--indicating no plaque--to 3--extensive plaque. Its distribution appeared similar to a normal distribution; the mean and standard deviation have been included as descriptors, and normal statistics have been used to assess group differences.

By contrast, the measures derived from scoring surfaces (or teeth) represent counts of events, such as caries development or receipt of fillings. As discussed in Technical Appendix 2B, the distributions of these variables are well approximated by compound Poisson distributions.* An important property of Poisson distributions is that a sum of Poisson variables also follows a (suitable) Poisson distribution. Given this assumption, the test of the difference between Head Start (HS) and non-Head Start (NHS) takes the form:

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*Much previous dental research examining the process of decay has employed a t-test, which incorporates the assumption that the data follow a normal distribution (or do not depart too seriously from normality). Many physical measures (such as height and weight) tend to take values that are most frequently near some central value and are distributed symmetrically about that value, so that a normal distribution can serve as a reasonable model. However, the processes of decay, receipt of fillings, and loss of teeth do no produce data that resemble a normal distribution. Instead, the data more nearly resemble counts of rare events. The most frequent value, zero (no decay, no fillings, or no missing teeth), often dominates the other values; but the data usually include a considerable number of moderate and large values, producing distributions that are strongly skewed to the right. Models based on the Poisson distribution are often appropriate for such data. The patterns observed in this study's dental data suggest that the observations do not constitute a homogeneous sample. That is, because of factors like hygiene practices or receipt of fluoride, children do not develop caries at the same rate. Thus, the underlying mechanism may be more satisfactorily described as a mixture of Poisson distributions. In this situation it would be inappropriate to apply a t-test, primarily because the sample variance on which it is based would not be a satisfactory estimate of the population variance. Fortunately, a theoretical property of the Poisson distribution makes it possible still to work with the total or the mean of the data and to apply a different form of approximation based on the normal distribution. The result, as discussed in more detail in Technical Appendix 2B, is the z-statistic.

$$z = \frac{\bar{x}_{HS} - \bar{x}_{NHS}}{\sqrt{\frac{n_{HS}\, x_{HS} + n_{NHS}\, x_{NHS}}{n_{HS} + n_{NHS}} \left[\frac{1}{n_{HS}} + \frac{1}{n_{NHS}}\right]}}$$

The null hypothesis states that prevalences in the two groups are equal. The alternative hypothesis implies a one-tailed test and values of z greater than +1.645 (when Head Start is expected to have larger values) or less than -1.645 (when Head Start is expected to have smaller values) are significant at $p < .05$. The direction of these expectations is clear for decay and fillings; the prevalence of decay is hypothesized to be lower, and the prevalence of fillings to be higher for Head Start than for non-Head Start children. The direction is less clear for missing surfaces and for the sum of decayed, missing, or filled surfaces (dmf). (See Appendix Note 4-1.) Missing surfaces, as described above, are primarily teeth extracted by a dentist because of caries damage. Typically, preschool children do not have missing teeth. Because the primary teeth are exfoliating, exfoliation is frequently selected as a third measure of dental health for children this age. However, because of the extensive decay observed among these children, and the comparatively greater prevalence of extractions, the choice of the measure "missing surfaces" seems appropriate in these analyses. Thus, the measure reflects both exposure to treatment and a preceding serious dental health problem. Similarly, dmf surfaces include both untreated (carious) and treated surfaces. Because this variable seems to provide a measure of overall need and/or use of dental services, a lower prevalence of dmf surfaces is hypothesized for the Head Start group.

The sample for analyses of the posttest prevalence measures, with their underlying Poisson distribution, is the randomly assigned children (Samples A and B). The null hypothesis of equal prevalence makes it important to confine these analyses to this sample. When the non-randomly-assigned children are included, the assumption of equal likelihood of outcomes may be questionable.

Prevalences on these variables differ dramatically across sites, as does the extent of fluoridation in county water supplies. Consequently, the dental analyses have been performed at the site level. In Greene and Humphreys Counties, with one exception, fluoride has not been present in the water. In Leakesville, from which approximately 13 percent of the children were drawn, water supplies began to be fluoridated at the beginning of the study year. In St. Clair County, the water supply is fluoridated in all communities except Lebanon. In Mingo County, water is fluoridated in two of the larger towns, Williamson and Matewan, but not in the rural areas. In Maricopa County, most of the residents use fluoridated water. Water is naturally fluoridated in two Maricopa County communities: Gila Bend and Tempe. Because of the profound differences in level of fluoridation, known to be related to caries development, and the concomitant differences in prevalence of decayed surfaces, most analyses have been performed within rather than across sites.

It must be noted that the evaluation team, during the pretest of the Head Start Health Evaluation, identified some children who were urgently in need of dental intervention—so urgently in need that the risk to the children of delaying referrals vastly exceeded the risk to the evaluation design. In many instances, the referrals for treatment were facilitated by the evaluation assistants in each site, resulting in decreases in the numbers of decayed surfaces and likewise increases in the numbers of filled and missing surfaces. These children's dmfs are easily identified outliers in Sample A. Consequently, in the analysis of the posttest data, where referral constitutes an intervention by the evaluation team, the affected children have been removed from the analysis. In each case, their presence or absence in the analyses is noted. In Table 4-1 these children's values at pre-test and posttest are displayed for number of decayed, filled and missing surfaces.

The dental evaluation also included a number of categorical measures, pertaining to the pedodontist's assessment of the child's need for treatment, the receipt of screening and treatment services through Head Start, and the mother's report of the child's dental history and care of teeth. Contingency table analyses were used to investigate differences in groups on the categorical variables.

Findings of the Dental Evaluation

Prevalence of Problems

In order to determine the prevalence of dental problems among low-income children, dental examination data collected at the pretest were examined. The dental health of these children was notably poor. Across the four sites, 59 percent of the children had decayed surfaces. As noted in Exhibit 4-3, prevalence of tooth decay was highest in Greene and Humphreys Counties both in terms of the proportion of children with decayed teeth (80 percent) and the average number of decayed surfaces (7.1) per child. Prevalence was lowest in St. Clair County, where 48 percent of the children had tooth decay and the number of decayed surfaces averaged 2.3. Prevalence of missing teeth, on the other hand, was low in all sites. Only a small proportion of the children had filled surfaces (8 percent across the four sites). Treatment of tooth decay was more common in Maricopa County than in the other three sites.

Exhibit 4-4 provides information about the profile and primary occlusion of children participating in the pretest evaluation. Crossbite was a more serious problem in Greene and Humphreys Counties and St. Clair County than in the other two sites. In 15 percent of the children, across the four sites, fractured teeth were found to be present.

The prevalence of oral hygiene problems among the pretested children is shown in Exhibit 4-5. Greene and Humphreys Counties and Mingo County evidence the most serious problems with plaque.

Urgent dental treatment needs of the children at pretest are displayed in Exhibit 4-6. Across the four sites, approximately one-fourth of the children were diagnosed as having urgent dental treatment needs. Site variation was evident, however. Greene and Humphreys Counties were on the high end of the scale, with one out of three children having urgent dental treatment needs particularly for problems of unacceptable tooth decay and occlusion. Twenty-seven percent of children in Mingo County had urgent dental needs but the profile of dental health problems was somewhat different from that in Greene and Humphreys Counties--the proportion of Mingo County children with serious tooth decay was 5 percent higher than in Greene and Humphreys Counties. Urgent treatment needs for oral hygiene problems and inflammation of the gums were common in Mingo County but almost non-existent

Exhibit 4-3

Prevalence of Affected Surfaces at Pretest: Number and Percent of Affected Children and Average Number of Affected Surfaces

Prevalence Variables	Pretested Children (Samples A and D) in:				
	Greene & Humphreys Counties n=91	St. Clair County n=109	Maricopa County n=94	Mingo County n=73	All Sites n=367
Decayed Surfaces					
Number of Affected Children	73	52	55	37	217
Percent of Affected Children	80	48	59	51	59
Average Number of Affected Surfaces/Child	7.09	2.32	4.06	5.47	4.57
Filled Surfaces					
Number of Affected Children	6	1	14	7	28
Percent of Affected Children	7	1	15	10	8
Average Number of Affected Surfaces/Child	.29	.07	1.77	.14	.57
Missing Surfaces					
Number of Affected Children	3	5	6	2	16
Percent of Affected Children	3	5	6	3	4
Average Number of Affected Surfaces/Child	.33	.27	.39	.34	.38
Average dmf	7.68	2.67	6.41	5.95	5.52

Exhibit 4-4

Profile, Primary Occlusion, and Occlusion Measures at Pretest

		Pretested Children (Samples A and D) in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Profile						
	N	89	109	93	73	364
Straight	%	99	95	100	51	88
Convex	%	0	3	-	44	10
Concave	%	1	2	-	6	2
Right Primary Occlusion						
	N	91	110	94	71	366
Flat	%	3	47	43	42	34
Distal Step	%	2	5	5	7	5
Mesial Step	%	95	48	52	51	61
Left Primary Occlusion						
	N	91	110	94	71	366
Flat	%	3	44	45	38	33
Distal Step	%	2	2	4	3	3
Mesial Step	%	95	55	51	59	65
Degree of Overbite	N	89	108	86	70	353
Openbite		8	10	6	7	8
0-5%	%	12	19	14	16	16
5-25%	%	40	12	24	11	22
25-50%	%	25	30	30	30	29
50-75%	%	8	17	9	17	13
75-100%	%	7	13	16	19	13
	%					
Size of Overjet	N	87	106	90	65	348
-2-0mm	%	7	6	4	0	5
0-1mm	%	17	14	23	9	16
1-2mm	%	28	36	29	28	30
3mm	%	28	26	20	32	26
4mm	%	12	9	13	5	10
5mm or more	%	9	9	10	26	13
Crossbite	N	87	109	94	71	361
	%	23	16	5	9	13
Presence of Fracture Teeth	N	83	108	94	71	356
	%	19	13	10	18	15

Exhibit 4-5

Average Oral Hygiene Index for Children in Pretest

Oral Hygiene Index[a]		Pretested Children (Samples A and D) in:				
		Greene & Humphreys Counties n=91	St. Clair County n=109	Maricopa County n=94	Mingo County n=73	All Sites
	N	91	109	94	73	367
	Mean	1.94	1.21	1.20	1.60	1.42
	Standard Deviation	.36	.34	.33	.69	—
Range	Min.	.38	.00	.38	.00	—
	Max.	3.00	1.83	1.92	3.00	—

[a] Range = 0 (no plaque) to 3 (extensive plaque).

Exhibit 4-6

Urgent Dental Treatment Needs of Children in Pretest

Urgent Dental Treatment Needs		Pretested Children (Sample A and D) in:				
		Greene & Humphreys Counties n=91	St. Clair County n=113	Maricopa County n=93	Mingo County n=73	All Sites n=376
Any	n	30	25	13	20	88
	%	33	22	14	27	23
Oral Hygiene	n	21	1	0	15	18
	%	2	1		21	1
Decay	n	16	14	11	16	67
	%	17	12	12	22	18
Inflammation	n	9	3	0	11	22
	%	1	3		15	6
Unacceptable Occlusion	n	17	2	1	5	25
	%	18	2	1	7	7

in the other three sites. Of the four sites, Maricopa County had the lowest proportion of children with urgent dental treatment needs. Tables 4-2 through 4-7 compare the prevalence of dental health problems of children assigned to Head Start and non-Head Start groups at pretest.

Exhibit 4-7 compares the dental health of children participating in the Head Start Health Evaluation with participants in both the Ten-State Nutrition Survey and the First National Health and Nutrition Examination Survey. The comparison was the measure df (average number of decayed and filled teeth) as an indicator of good or poor dental health. Values of df are shown by race (white, black, and Hispanic).

At pretest, the df of the children in the Head Start Health Evaluation was comparable to the df of children in low-income ratio states of the Ten-State Nutrition Survey, but significantly higher than that of children in the First National Health and Nutrition Examination Survey or high-income ratio states (of the Ten-State Nutrition Survey). The comparison of greatest interest is that between children at posttest and children in the other two surveys. The comparison indicates that the dental health of evaluated children declines significantly with age. The df of both Head Start and non-Head Start children at posttest significantly exceeds that of children in the low-income ratio states of the Ten-State Nutrition Survey. Thus, children in the Head Start Health Evaluation (who come from medically underserved areas) have poorer dental health (as measured by df) than their counterparts of a decade ago in the Ten-State Nutrition and First National Health and Nutrition Examination Surveys.

Dental Services Provided by Head Start and Other Sources

The Head Start Performance Standards state that the dental health services component shall include "obtaining or arranging for basic dental care services" as follows:

- Dental examination;
- Services required for the relief of pain or infection;
- Restoration of decayed primary and permanent teeth;
- Pulp therapy for primary and permanent teeth as necessary;
- Extraction of non-restorable teeth;

Exhibit 4-7

Average Number of Decayed and Filled Teeth[a] in Children Two through Five Years of Age in Head Start Health Evaluation[b], the Ten State Nutrition Survey, and the First National Health and Nutrition Examination Survey

	Head Start Health Evaluation			First National Health and Nutrition Examination Survey	Ten-State Nutrition Survey		Comparison of Posttest Data with Ten State Low-Income Ratio States	
	At Pretest	At posttest[c]						
	Head Start and Non-Head Start	Head Start	Non-Head Start		Low-Income Ratio States[c]	High-Income Ratio States[c]	Head Start z[d]	non-Head Start z[d]
White	3.01 n=98	4.28 n=40	4.90 n=42	0.9 n=2478	3.47 n=412	1.83 n=1291	2.60*	4.65*
Black	3.0 n=195	5.01 n=105	4.20 n=80	0.9 n=438	2.17 n=1288	1.48 n=476	18.14*	11.64*
Hispanic	3.45 n=71	4.19 n=43	4.07 n=14	—	3.01 n=221	2.02 n=435	3.96*	2.20*

[a] Head Start Health Evaluation df includes permanent teeth where present; permanent teeth are excluded in Ten State measure.

[b] Posttest cross-sectional sample of children randomly assigned and not referred for emergency care.

[c] Low-income ratio states are those whose median poverty income ratio (PIR) is below the overall median for participating states. The low-income states were South Carolina, Louisiana, Texas, Kentucky, and W. Virginia. The high-income states included Michigan, California, Washington, Massachusetts, New York State and New York City. The poverty income ratio is a measure of family income which takes into account family size, gender of the family head, and place of residence.

[d] Values of z beyond ± are significant at $p < .05$ as shown by (*).

- Dental prophylaxis and instruction in self-care oral hygiene procedures; and
- Application of topical fluoride in communities which lack adequate fluoride levels in the public water supply

A review of the children's Head Start health records furnished information about the frequency with which the Head Start programs provided dental services, as well as the kinds and frequency of follow-up services. As shown in Exhibit 4-8, 80 percent of the children across the four sites were examined, ranging from 65 percent in Mingo County to 100 percent in Maricopa County. Of examined children, 47 percent were reported to have dental needs (including prophylaxis). Considerable site variation again was evident, the percentage of examined children with reported dental needs ranged from 26 percent in Greene and Humphreys Counties and in Mingo County to 91 percent in Maricopa County. With respect to caries, fillings were reported to be necessary for eight percent of the examined children in Greene and Humphreys Counties, and extractions were necessary for three percent of those examined.* In Mingo County and Maricopa County, fillings were needed by proportionately more children; this finding was recorded for 41 and 66 percent, respectively, of those examined. Of the Head Start children receiving a dental examination, treatment was provided for 43 percent. Only in Mingo County do Head Start health records show that more children than those with findings were treated. After adjustment for this peculiarity, 82 percent of the children found by Head Start to have dental needs were referred for treatment.

There is no evidence that Head Start provides dental services to "special" groups of children. As shown in Tables 4-8 through 4-10, there do not appear to be any differences between the rates of dental screens, dental findings, or dental treatments for special groups of children such as those with incomes less than $1295 or teenaged mothers. Moreover, as discussed in Chapter Two, there were also no differences in the rates of dental problems

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*The evaluation results showed the number of decayed surfaces was higher in Greene and Humphreys than in other sites and that the vast majority of water supplies in those counties are not fluoridated. Because the Head Start health records simply summarize information from a dental chart completed by a local practitioner and reflect local standards of practice regarding filling of primary teeth (which are frequently not filled), it is difficult to relate the low level of need reported to Head Start to that observed in Head Start Health Evaluation examinations.

Exhibit 4-8

Dental Services Provided by Head Start to Head Start Children as a Result of the Dental Evaluation (Samples A, B, C)

Head Start Dental Services		Posttested Head Start Children (Samples A,B,C) in:				
		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=102	Mingo County n=112	All Sites n=449
Child Received Dental Examination	n	84	102	102	73	361
	%	66	94	100	65	80
Results:						
Any Dental Needs	n	22/84	37/102	93/102	19/73	171/361
	%	26	64	91	26	47
Fillings Needed	n	7	8	67	19[a]	101
	%	8	14	66	41	28
	range	(2-18)	(1-10)	(1-13)	(1-11)	
Extractions Needed	n	3	1	3	--	7
	%	4	2	3	--	--
Gingiva	n	4	--	75	1	80
	%	5	--	74	1	22
Bone Condition	n	4	--	--	--	4
	%	5	--	--	--	--
Oral Hygiene	n	2	--	43	--	45
	%	2	--	42	--	40
Other Condition	n	2	37	27	--	66
	%	2	64	29	--	47
Treatment/Examined	n	19	33	69	36	157
	%	23	32	68	49	43
Treatment/Findings	n	19	33	69	19[a]	140
	%	86	89	74	100	82

[a] Adjusted to reduce number of children treated to the number with dental needs.

detected by the Head Start Health Evaluation for the children Head Start examined and the children they did not examine. Approximately one-third of both groups were found to have dental problems in the posttest evaluation.

There was agreement between the findings of the Head Start Health Evaluation dental examination and those reported in the Head Start health records in the majority of cases. However, in one out of four cases, no findings were reported based on the Head Start dental examination while pedodontists of the Head Start Health Evaluation found dental health needs. Such discrepancies were most common in Mingo County where 47 percent of the children who had been examined and reported to have no findings in the Head Start Health records were deemed to be in need of dental care by the evaluation team. What this finding suggests is a need for Head Start to examine the quality of dental examinations provided to enrolled children and to bring about improvements where needed. Where dental services are donated to the program, however, it may not be possible to change the outcome of the dental examinations.

Since local Head Start programs examined only a part of the Head Start group, it is important to look closely at the children Head Start did not examine. Do parents depend upon Head Start to provide a dental checkup and thus do not take the child to the dentist themselves while the child is enrolled? Such a substitution effect would be evident in these data if, among the Head Start children not receiving examinations, fewer parents report recent dental visits than parents whose children were examined. As shown in Exhibit 4-9, no difference is apparent in the proportion of parents of examined and non-examined Head Start children reporting recent dental visits. Moreover, in all four sites, the proportion of Head Start children who have been to a dentist is substantially higher than that of the non-Head Start groups.

Finally, we examined whether children from families with prior Head Start experience had better dental health than children from families entering Head Start for the first time. Pretest measures were used to answer this question. As illustrated in Tables 4-11 through 4-14, there appears to be evidence of such a trend. It suggests that Head Start participation may lead to improvements in the dental health of younger children in the family.

Exhibit 4-9

Children Whose Mothers Report They Have Been to the Dentist in the Previous Year by Those Examined and Not Examined by Head Start

Examined/ Not Examined/by Head Start		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=27	NHS n=101	HS n=108	NHS n=86	HS n=102	NHS n=61	HS n=118	NHS n=109	HS n=447	NHS n=387
Examined by Head Start	n	81	0	56	0	101	0	69	0	307	0
	%	32		75		90		71		68	
Not Examined by Head Start	n	39	99	49	84	0	58	12	108	100	349
	%	31	22	71	33	0	38	67	20	56	27

Impact of Head Start on Children's Dental Health

Longitudinal Analysis. The longitudinal sample (A) was examined in order to measure changes in dental health between Head and non-Head Start children during the study year as evidenced by recent decay (present at posttest and not at pretest), fillings received since the pretest, and missing surfaces of teeth lost as a result of extraction or trauma since the pretest examination. Exhibit 4-10 shows the results of these analyses. (Children whose dental problems were so severe that they were immediately referred for treatment at the pretest were not included, because the intervention might dilute Head Start effects.) In all sites, except in Maricopa County, the incidence of decay was higher for the Head Start than the non-Head Start group; none of the group differences, however, were statistically significant.* In all sites, except St. Clair County, where incidence of fillings was evident, the Head Start group scored higher than the non-Head Start group. Only in Maricopa County was the group difference large and statistically significant. There were no significant differences in the incidence of missing surfaces.

The dental health of children in the longitudinal sample (A) is shown in Exhibit 4-11. (Note that no adjustments for pretest scores were made in these analyses.) Head Start's impacts on the dental health of children in Maricopa County show evidence on decayed, filled, and missing surfaces. Head Start children in St. Clair County also have few decayed surfaces. Though not statistically significant (because of the hypothesized direction of the one-tailed test) one cannot ignore the higher prevalence of decayed surfaces among the Head Start children in Greene and Humphreys Counties. (Were a two-tailed test applied, the non-Head Start children have significantly fewer cavities and the incidence findings in Exhibit 4-10 add further credance to this concern.)

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*It should be noted that differences between the Head Start and non-Head Start groups, including all children in Sample A, initially were statistically significant. To determine whether this unexpected finding was the consequence of outliers, the calculations were repeated excluding one child with the highest dmf score. Excluding this child, it turned out that the Head Start group was not significantly higher than the non-Head Start group with respect to mean incidence of decay.

Exhibit 4-10

Incidence of Decayed, Filled, and Missing Surface for Head Start and Non-Head Start Children at Posttest and Not Referred for Treatment by the Pretest Evaluation

Incidence Variables		Longitudinal Children (Sample A)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=37	NHS n=24	HS n=25	NHS n=17	HS n=40	NHS n=16	HS n=15	NHS n=16
Incidence of Decay	$\bar{x}$	5.86	4.59	2.92	2.59	1.13	1.63	2.80	2.44
	z[a]	2.02		.62		-1.50		.62	
Incidence of Fillings	$\bar{x}$	.08	.05	.00	.00	4.80	.06	.40	.25
	z	.52				8.63*		.74	
Incidence of Missing Surfaces	$\bar{x}$	.14	.68	.21	.59	.38	.63	.00	.00
	z	-1.52		-.89		-.57			

[a] Values of z beyond +1.645 are significant at $p < .05$, shown as *.

Exhibit 4-11

Prevalence of Decayed, Filled, and Missing Surfaces for Head Start and Non-Head Start Children at Posttest and Not Referred for Treatment by the Pretest Evaluation

Prevalence Variables		Longitudinal Children (Sample A) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=37	NHS n=24	HS n=25	NHS n=17	HS n=40	NHS n=16	HS n=15	NHS n=16
Decayed Surfaces	$\bar{x}$	11.0	8.42	3.48	4.88	2.25	5.25	4.00	3.19
	z^a	3.12		-2.21*		-5.75*		1.19	
Filled Surfaces	$\bar{x}$	.08	.17	.00	.00	5.73	.06	.40	.25
	z	-.96				2.45*		.73	
Missing Surfaces	$\bar{x}$	.14	.63	.40	.59	.38	2.19	.00	.00
	z	-1.46		-.39		-2.90*			
Dmf	x	11.22	9.17	3.88	5.47	8.28	11.50	4.40	3.44
	z	2.28		-2.00*		-3.05*		1.35	

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[a] Values of z beyond ± 1.645 are significant at p < .05, shown as *.

Using dmf as a summative measure of dental health experience, it is evident that Head Start children in both St. Clair County and Maricopa County have significantly better dental health than the non-Head Start children. In contrast, Head Start children in Greene and Humphreys Counties tend to have poorer dental health than non-Head Start children, mostly accounted for by the high rate of decayed surfaces. Even if the calculations are repeated (as they were for the incidence variables excluding the one child with the highest dmf score) the prevalence of decayed surfaces of the Head Start group in this site remained higher than of the non-Head Start group.

Crossectional Analyses. Crossectional analyses on different samples were performed to determine prevalence of decayed surfaces, filled surfaces, and missing surfaces (to assess Head Start impacts) as well as the total dmf score at posttest (to assess the cumulative dental health of Head Start children compared to children in the non-Head Start group).

The dental health at posttest of the combination of Sample A (children who had received a pretest) and Sample B (children who had not received a pretest) also was assessed. Where relevant, the augmentation sample C (not randomly assigned) was also examined. These analyses on somewhat larger samples of children reveal similar trends to those found in the longitudinal sample and provide evidence of Head Start effectiveness in Greene and Humphreys Counties and St. Clair County in some analyses.

Exhibit 4-12 shows, the percentages of children with at least one decayed, filled, or missing surface. The relatively poor dental health of these low-income children is evident when the non-Head Start children are considered. In each site at least half the children have at least one carious surface, and in Greene & Humphreys Counties, 94 percent have. In three sites, few children have had teeth filled (3 to 19 percent); only in Maricopa County have as many as 24 percent of the 17 non-Head Start children had a surface filled. Six to eleven percent of the children in three sites have at least one missing tooth; in Maricopa County one out of four non-Head Start children have one or more missing teeth. Even among the Head Start children, three to eight percent of the children have missing teeth, and many children have no fillings. Standards of practice at the local level with regard to filling primary teeth may explain why some fraction of the observed caries have not been filled. Moreover, where the Head Start referral mechanism depends on the family for implementation, parents may not follow through consistently in obtaining treatment. Still, the

Exhibit 4-12

Prevalence of Affected Surfaces for Head Start and Non-Head Start Children at Posttest

Prevalence Variables		Children in Samples A and B and Not Referred for Treatment by the Pretest Evaluation									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=71	NHS n=46	HS n=37	NHS n=46	HS n=50	NHS n=17	HS n=32	NHS n=30	HS n=190	NHS n=139
Decayed Surfaces	n	67	43	22	30	25	10	18	22	132	105
	%	94	94	60	65	50	59	56	73	69	76
Filled Surfaces	n	5	3	1	2	31	4	6	1	43	10
	%	7	7	3	4	62	24*	19	3	23	7
Missing Surfaces	n	4	3	3	5	3	4	1	2	11	14
	%	6	7	8	11	6	24*	3	7	6	10

*Chi-squared is significant at $p \leq .05$.

prevalence of teeth presumed lost because of extraction or trauma is serious and appears to exceed that typically found in preschool populations.

A significant positive Head Start effect was found only in Maricopa County where a higher proportion of the Head Start children compared to the non-Head Start group had one or more filled teeth. (A similar positive trend was evident in Mingo County, although the group difference was not statistically significant.) In all sites, fewer Head Start than non-Head Start children had one or more missing teeth. Only in Maricopa County was the group difference statistically significant.

The number of decayed, missing, and filled surfaces at posttest in the same groups of children is shown in Exhibit 4-13. (Because it was not possible to collect radiological evidence of caries, the data represent conservative estimates of the extent of decay.) Comparisons of Head Start and non-Head Start children reveal a number of group differences. In Greene and Humphreys Counties and in Maricopa County, Head Start children have a significantly lower average number of decayed surfaces. In these sites, as well as in Mingo County, Head Start children have, on average, significantly more fillings than do the non-Head Start children. In Maricopa County, the Head Start group has a significantly lower average number of dmf surfaces. Similarly, in Exhibit 4-14 it is evident that in Maricopa and Mingo Counties Head Start children are more likely to have had teeth filled. These findings suggest that the provision of Head Start screening and treatment services has led to substantial improvement in certain components of dental health for Head Start participants in these sites.

The oral hygiene index also showed that Head Start children had significantly lower average index scores (no plaque = 0) than did non-Head Start children in two sites. As shown in Exhibit 4-15, St. Clair and Maricopa County Head Start children had, on average, index scores close to 1.45, while the non-Head Start children had comparatively higher scores exceeding 1.50. Classification of the profile and the primary occlusion are shown in Exhibit 4-16. Because these variables reflect basic physical measurements and are not considered especially sensitive to dental intervention, statistical comparisons of Head Start and non-Head Start groups have not been performed.

Exhibit 4-16 also shows the distribution across sites of three other occlusion measures--overbite, overjet, and crossbite--as well as the presence

Exhibit 4-13

Average Numbers of Affected Surfaces for Head Start and Non-Head Start Children Not Referred by the Pretest Evaluation

Prevalence Variables		Posttested Children in Samples A & B:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=71	NHS n=46	HS n=37	NHS n=46	HS n=50	NHS n=17	HS n=33	NHS n=30
Decayed Surfaces	$\bar{x}$	11.79	13.04	3.59	4.15	2.10	4.94	4.53	4.40
	z	-2.30*		-1.28		-6.03*		.24	
Filled Surfaces	$\bar{x}$	1.58	.11	.14	.20	6.78	3.82	.44	.13
	z	7.74*		-.67		4.28*		3.22*	
Missing Surfaces	$\bar{x}$	.38	.34	.41	.65	.30	2.06	.31	.50
	z	.04		-.68		-3.24*		-.53	
dmf	$\bar{x}$	13.72	13.67	4.11	5.00	9.12	10.82	5.28	5.03
	z	.07		-1.33		-1.71*		.38	

[a] Values of z beyond ± 1.645 are significant at p < .05, shown as *.

Exhibit 4-14

Prevalence of Fillings at Posttest of Head Start and Non-Head Start Children[a]

Prevalence of Fillings		Posttested Children (Samples A, B, C) Excluding Referred Children and Children with No History of Caries in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=117	NHS n=86	HS n=67	NHS n=50	HS n=78	NHS n=35	HS n=84	NHS n=78
Has Fillings	n	14	6	6	3	60	11	21	7
	%	12	7	9	6	77*	31	25*	9

[a] Chi squared test is significant at p ≤ .05 shown as *.

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Exhibit 4-15

Average Oral Hygiene Index for Head Start and Non-Head Start Children

Oral Hygiene Index[a]	Posttested Children (Samples A, B C) in:							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	HS	NHS	HS	NHS	HS	NHS	HS	NHS
n	127	101	104	84	104	60	119	107
Mean[b]	1.84	1.85	1.43	1.52*	1.44	1.61*	1.70	1.72
Standard Deviation	.54	.56	.23	.28	.44	.35	.41	.41
Range Min.	.17	.50	1.00	.90	.25	.88	.75	.83
Max.	3.00	3.00	2.08	2.50	2.50	2.42	2.60	2.80

[a] Range = 0 (no plaque) to 3 (extensive plaque).

[b] Non-Head Start significantly higher than Head Start at $p \leq .05$, shown as *.

of fractured teeth, and the degree to which the tooth has been fractured.* The occlusion measures represent physical relationships in the skeletal system of bones and teeth. Direct intervention to correct these relationships involves orthodontics and is not typically begun before adolescence, when the permanent occlusion has long been in place. The extent of overbite, overjet, and crossbite are only moderately sensitive to receipt of professional services and to dental health education. For example, restoration of cavities may result in some decrease in the amouint of overbite. Overjet and crossbite may be related to oral habits like use of a pacifier and

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*No differences were observed between randomly assigned and non-randomly assigned children on overbite, overjet, crossbite, presence and degree of fractured teeth. Consequently, these data are combined across waves of recruitment.

Exhibit 4-16

Classifications of the Profile and Primary Occlusion for Head Start and Non-Head Start Children[a]

		Posttested Children (Samples A, B, C)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Profile									
	N	127	101	105	84	105	60	119	108
Straight	%	85	79	28	26	50	58	22	31
Convex	%	7	17	72	74	51	40	69	69
Concave	%	8	4	-	-	-	2	9	1
Right Primary Occlusion[b]									
	N	124	98	107	84	106	60	114	106
Flat	%	9	9	26	29	32	40	29	35
Distal Step	%	2	3	1	4	9	5	8	7
Mesial Step	%	89	88	73	68	59	55	63	59
Left Primary Occlusion[c]									
	N	122	98	107	84	106	59	112	107
Flat	%	7	8	26	20	30	42	33	34
Distal Step	%	4	2	2	4	12	5	5	9
Mesial Step	%	89	90	72	76	58	53	63	57
Degree of Overbite	N	120	96	101	81	93	57	113	107
Openbite	%	8	14	8	7	10	4	1	4
0-5%	%	14	24	18	16	19	14	9	8
5-25%	%	14	24	18	16	19	14	9	8
25-50%	%	26	23	29	30	30	16	25	23
50-75%	%	18	18	12	25	8	18	21	28
75-100%	%	11	5	6	4	8	14	34	27
Size of Overjet	N	120	96	101	82	93	52	112	103
-2-0mm	%	7	3	10	7	12	10	4	5*
0-1mm	%	8	8	23	22	32	15	11	3
1-2mm	%	32	27	27	35	17	31	20	21
3mm	%	31	34	28	21	22	29	46	33
4mm	%	18	19	6	6	9	10	8	18
5mm or more	%	6	8	7	9	9	6	13	20
Crossbite	N	127	100	107	84	106	60	119	109
	%	20	10*	16	12	6	7	9	5
Presence of Fractured Teeth	N	127	100	107	83	105	60	118	109
	%	14	18	59	66	11	17	30	27
Degree of Fracture	N	127	100	106	84	106	60	119	109
No fracture	%	86	82	42	35*	89	83	70	73
Enamel fractured	%	13	16	58	57	8	8	21	14
Enamel & Dentin fractured	%	2	2	1	8	4	8	9	13

[a] Chi-squared test is significant at p ≤ .05, shown as *.

[b] Five children have right permanent occlusion--the permanent teeth had erupted and were observed in scoring the occlusion.

[c] Seven children had left permanent occlusion.

thumb-sucking. Thus, parent education about the conseqences of these habits may modify and moderate, to some degree, crossbite and the extent of overjet. Comparisons of the Head Start and non-Head Start children do not reveal differences on overbite. However, in Mingo County, the size of the overjet is greater for non-Head Start children. Prevalences of crossbite similar among Head Start and non-Head Start children in three sites; however, in Greene and Humphreys Counties, crossbite is observed in 20 percent of the Head Start children compared to 10 percent of the non-Head Start children. When fractured teeth are considered, no differences are evident between Head Start and non-Head Start children. In St. Clair County, however, the degree of fracture differs between groups. Among the non-Head Start children, 8 percent have a tooth fractured in both the enamel and dentin (a more severe fracture), while only one percent of the Head Start children do.

The need for urgent treatment of dental health conditions was a clinical judgment of the examining dentist; that is, the pedodontists were asked to identify children whom they would immediately treat if they had seen them in their own practice. Results of this part of the dental examination are shown in Exhibit 4-17. With respect to oral hygiene, only in St. Clair County did the Head Start children differ significantly from the non-Head Start children; in that site three percent of the Head Start group, compared to 11 percent of the non-Head Start group, needed treatment for removal of debris and plaque and instruction about hygiene practices. Head Start and non-Head Start children did not differ in their needs for treatment of decay, nor in the frequency with which unacceptable occlusion was observed. However, again in St. Clair County, the groups differed in their need for treatment of gum inflammation. Twelve percent of the children in the non-Head Start group were judged to need this treatment while only 3 percent of the Head Start group did.

Care of teeth both at home and through professional services was included in the medical history; distributions obtained on these variables are shown in Exhibit 4-18. On one key indicator of care of teeth--whether the child has been to the dentist--the randomly assigned children (Samples A and B) differ significantly from those who were not randomly assigned (Sample C) as shown in Tables 4-15 through 4-18. Relatively few of the non-randomly assigned comparison children have seen a dentist. In Greene and Humphreys Counties and in Mingo County, only approximately 15 percent have been to a

Exhibit 4-17

Urgent Dental Treatment Needs of Head Start and Non-Head Start Children at Posttest[a]

Urgent Dental Treatment Needs		Posttested Children (Samples A, B, C)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Any	n	127	101	108	85	106	60	117	107
	%	28	23	16	22	9	15	27	29
Oral Hygiene	n	127	101	108	85	106	60	117	107
	%	2	4	3	11*	-	-	3	0
Decay	n	126	101	108	85	106	60	117	107
	%	7	10	9	13	8	15	22	23
Inflammation	n	127	101	108	85*	106	59	117	107
	%	6	4	3	12	-	-	12	8
Unacceptable Occlusion	n	126	97	103	83	106	58	116	107
	%	21	13	8	10	-	-	8	5

[a] Chi-squared test significant at $p \leq .05$ shown as *.

dentist, in the remaining sites no more than 35 percent have. Because of these differences, the data shown in Exhibit 4-18 are presented separately for the respective samples of children. Results of chi-square tests are included for analyses comparing Samples A and B versus Sample C, and Head Start versus non-Head Start (with all samples combined). There are no significant differences between the Head Start and non-Head Start groups on whether the family visits the dentist regularly or has dental insurance. However, in each site, Head Start children are more likely to have ever visited a dentist than non-Head Start children. Except in Greene and Humphreys Counties, Head Start children are more likely to have seen a dentist

Exhibit 4-18

Dental History and Care of Teeth According to Mother's Report for Head Start and Non-Head Start Children in the Randomly Assigned Samples (A and B) and the Non-Randomly Assigned Sample (C)

Dental History and Care of Teeth		Greene & Humphreys Counties						St. Clair County					
		Samples A&B			Sample C			Samples A&B			Sample C		
		HS n=76		NHS n=52	HS n=50		NHS n=48	HS n=37		NHS n=45	HS n=71		NHS n=39
Brush Teeth at Least Once a Day	N	62		38	44		32	29		33	61		33
	%	82		73	88	a	67	78		73	86		85
Ever Been to Dentist	N	31		17	18		7	31		20	60		16
	%	41		33	35	a,b	15	84	a	44	85	a	36
Been to the Dentist in Past Year	N	27		15	14		7	25		17	53		11
	%	36		29	27	b	15	69	a	38	75	a	28
Has Dental Insurance	N	46		21	16		20	21		32	55		23
	%	60	a	40	32	b	42	57		70	78	a	59
		HS n=61		NHS n=40	HS n=40		NHS n=40	HS n=31		NHS n=37	HS n=64		NHS n=36
Family Visits Dentist Regularly	N	36		22	22		25	19		27	49		19
	%	59		55	55	b	63	61	a	73	77	a	53

[a] Chi-squared test significant at $p \leq .05$ for Head Start/Non-Head Start comparison within Samples A & B, or Sample C.

[b] Chi-squared test significant at $p \leq .05$ for comparison of Samples A and B versus Sample C.

Exhibit 4-18 (continued)

Dental History and Care of Teeth According to Mother's Report for Head Start and Non-Head Start Children in the Randomly Assigned Samples (A and B) and the Non-Randomly Assigned Sample (C)

Dental History and Care of Teeth		Maricopa County						Mingo County					
		Samples A&B			Sample C			Samples A&B			Sample C		
		HS n=50		NHS n=16	HS n=56		NHS n=43	HS n=35		NHS n=32	HS n=83		NHS n=77
Brush Teeth at Least Once a Day	N	44		13	51		29	24		21	54		44
	%	88		81	91	a	67	69		66	65		57
Ever Been to Dentist	N	47		12	50		15	29		12	56		12
	%	94	a	75	89	a,b	35	83	a	38	67	a,b	16
Been to the Dentist in Past Year	N	46		11	49		12	29		10	54		12
	%	92	a	67	87	a,b	28	83	a	32	65	a,b	16
Has Dental Insurance	N	7		1	10		10	15		10	25		20
	%	14		6	18		18	43		31	30		26
		HS n=44		NHS n=15	HS n=53		NHS n=39	HS n=29		NHS n=28	HS n=68		NHS n=69
Family Visits Dentist Regularly	N	13		4	26		13	13		2	22		29
	%	30		27	49	b	33	45	a	7	32	a	42

[a] Chi-squared test significant at p ≤ .05 for Head Start/Non-Head Start comparison within Samples A & B, or Sample C.

[b] Chi-squared test significant at p ≤ .05 for comparison of Samples A and B versus Sample C.A

dentist, in the remaining sites no more than 35 percent have. Because of these differences, the data shown in Exhibit 4-18 are presented separately for the respective samples of children. Results of chi-square tests are included for analyses comparing Samples A and B versus Sample C, and Head Start versus non-Head Start (with all samples combined). There are no significant differences between the Head Start and non-Head Start groups on whether the family visits the dentist regularly or has dental insurance. However, in each site, Head Start children are more likely to have ever visited a dentist than non-Head Start children. Except in Greene and Humphreys Counties, Head Start children are more likely to have seen a dentist in the past year than are non-Head Start children. Further, in Greene and Humphreys and Maricopa Counties, Head Start participants are more likely than the comparison group to brush their teeth at least once a day.

The Head Start randomly assigned sample (Samples A and B) were also compared with the Head Start non-randomly assigned sample (Sample C) on the prevalence measures. In this analysis, the children referred as a result of the pretest examination have been included for two reasons. First, since the analysis is confined to the Head Start sample, all children have experienced some intervention by Head Start with respect to dental health. Second, children in the Head Start-recruited group (Sample C) did not participate in the pretest and, thus, could not have been referred. Consequently, to exclude referred children is to exclude potentially extreme members of one group without the ability to exclude comparable members of the other group. As shown in Exhibit 4-19, in many of these comparisons, the randomly assigned Head Start children differ from the non-randomly assigned group. With respect to the decay, the mean of the randomly assigned Head Start children in Mingo County significantly exceeds that of the group recruited by Head Start. In Maricopa County, the mean number of fillings is higher for the non-randomly-assigned group. In Greene and Humphreys County and in Mingo County, the non-randomly assigned children have more missing surfaces, on average. Finally, in Greene and Humphreys Counties the randomly assigned children have a lower mean dmf, while in Maricopa County, this group has a higher mean dmf than the group recruited by Head Start.

Exhibit 4-19

Comparison of Randomly Assigned and Non-Randomly Assigned Children in Head Start (Referred Children Included)

Prevalence Variables		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Samples A & B n=76	Sample C n=50	Samples A & B n=37	Sample C n=71	Samples A & B n=50	Sample C n=56	Samples A & B n=35	Sample C n=83
Decayed Surfaces	mean	12.34	13.24	3.59	3.36	2.10	1.68	7.97	6.68
	z	-1.39		.63		1.58		2.42*	
Filled Surfaces	mean	2.00	2.44	.14	.23	6.78	5.61	.74	1.08
	z	-1.64		-1.04		2.43*		-1.71	
Missing Surfaces	mean	.84	2.40	.41	.64	.30	.54	.71	2.02
	z	3.18*		-.70		-.83		-2.27*	
Dmf	mean	14.95	17.86	4.11	4.14	9.12	7.82	9.43	9.77
	z	-3.42*		-.06		2.10*		-.42	

*In a two tailed test, values of z beyond ± 1.96 are significant at $p < .05$ and show as *.

Conclusion

The results of the Head Start Health Evaluation support the conclusion that the Head Start's program of dental health services leads to improved dental health status of the Head Start children. A significantly higher proportion of Head Start children than non-Head Start children in all sites have visited a dentist. Moreover, Head Start children, in at least two sites, have lower incidence of decay and a higher number of fillings. Likewise in two sites oral hygiene scores seem to indicate that a higher proportion of the Head Start children have received prophylactic care, and Head Start children are more likely to brush their teeth once a day and maintain better hygiene practices than children in the non-Head Start group.

Furthermore, findings suggest that Head Start participation may lead to improvements in the dental health of younger children in the family. Children from families with prior Head Start experience appear to have better dental health status even before entry into Head Start.

However, the extent of the impacts of Head Start's services depends considerably on other factors such as fluoridation in the community water system, the procedures Head Start adopts to deliver services, the availability of dentists to serve those in the community (including the children), and the knowledge and attitudes of parents with regard to the dental health of their children. For example, fluoride, a known inhibitor of caries development, was absent in the water systems in Greene and Humphreys Counties and Mingo County. In both of these locations, the prevalence of dental caries was substantially higher than in St. Clair County and Maricopa County, where most of the children drink fluoridated water. Hence, children in the non-fluoridated areas enter Head Start with a substantial number of decayed teeth, thereby presenting the program with many more dental health needs than in other sites. Furthermore, even with intervention, the children who enter the program with a high prevalence of caries tend to continue to have a high incidence of caries after Head Start intervention.*

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*Comparison of the average number of decayed, filled and missing surfaces in fluoridated and non-fluoridated areas is given in Table 4-19.

The procedures Head Start adopts to examine and treat children to meet their dental health needs are also important factors in the dental health status of the children. Where Head Start places a considerable amount of responsibility on the parents to meet the dental health needs of their children, the needs are not well met. Procedures such as requiring the parents to arrange for a dental examination for their children prior to entry into Head Start (as in St. Clair County) or to assume the responsibility for following through on a course of dental treatment after the child has been examined by Head Start (as in Greene and Humphreys Counties and Mingo County) do not tend to lead to completion of a desirable course of treatment for the children. By contrast, a procedure such as that implemented in Maricopa County (a fluoridated area), where the program purchases examination, prophylaxis, and treatment as needed, on a contractual basis (at a fixed cost per child), it is evident that the dental health status of the Head Start children is much better than that seen in any other community in the Head Start Health Evaluation.

Other factors such as the number of dentists available and accessible by the population of the community or county also have an impact on dental health. Both of the very rural sites, Greene and Humphreys Counties and Mingo County, are excellent examples of the difficulties which either Head Start or parents have in procuring dental services for children. The lack of sufficient dental health professionals to serve a community also may have implications for the family's attitudes toward dental health. If the parents are not accustomed to adequate dental health care, they may not know the importance of, and seek services to improve, the dental health status of their children. These findings strongly suggest that in certain communities systematic provision of Head Start dental services to low-income preschool children leads to substantially improved dental health.

CHAPTER FIVE

ANTHROPOMETRIC EVALUATION

Anthropometric Indicators

Measurements of body dimensions (anthropometry) can be made reliably (Roche, 1978) and generally accepted protocols allow comparability with other studies. Good reference data from the National Center for Health Statistics allow determination of growth status within age and gender categories, relative to national populations.

Measures of overall body size, such as height and weight, generally reflect the total cumulative nutriture (height) or short-term nutriture (weight) of the child (Himes, 1980). It should be noted that a few days of serious illness can alter weight considerably. A gross measure such as weight, however, does not reveal the composition of the body. For example, one cannot determine whether an overweight child is heavy because of excess fat or because of unusual muscularity. The thickness of the subcutaneous fat therefore serves to identify degrees of fatness or leanness. Fat thickness, measured by triceps skinfold thickness, provides a better criterion for determining obesity than body weight alone or a combination of height and weight (Himes, 1980).

Anthropometric data were taken for each child by members of the examination teams who had been specially trained to follow recommended protocols. The protocols closely follow those used to collect the data on which the growth charts for the National Center for Health Statistics were based (Hamill et al., 1979). The measurements, the equipment, and the protocol used for each are presented in Exhibit 5-1. The details of the measurement techniques generally correspond to those described by Roche (1978). Two derived anthropometric indicators were used: weight for height and estimated muscle circumference.

Because height and weight measure only single aspects of a child, it is customary to combine them to gain more information concerning the child's body proportions and build. For statistical and theoretical reasons, the weight-height relationship is best expressed as a regression of weight on height. This can be achieved by using regression-type reference data like those from the National Center for Health Statistics. The resulting measure, "weight for height," describes the child's weight status relative to other children of the same height. This measure is particularly sensitive to acute nutritional insult to the child and is determined irrespective of age in preadolescent children.

Estimated muscle circumference estimates the muscularity of the arm, by using the measured arm circumference and the measured triceps skinfold thickness. The definition treats the arm as a cylinder and the estimated muscle circumference (EMC) is computed according to the formula:

Exhibit 5-1

Anthropometric Measures, Equipment Used and Protocol for Measurement

Measure	Equipment	Protocol
Height	Portable stadiometer	Child's height measured to the nearest millimeter without shoes.
Weight	Health-Co balance scale	Child's weight measured to the nearest half pound; shoes and extra clothing removed.
Arm Circumference	Ross "Ensure" Insertapes	Child's arm circumference measured on left upper arm to the nearest millimeter.
Triceps Skinfold Thickness	Lange Caliper	Thickness of child's subcutaneous fat, measured at left triceps to nearest 0.5 millimeter (average of two measurements).
Weight for Height	(none)	Child's weight status relative to other children of the same height.
Estimated Muscle-Circumference	(Derived Measure)	Calculated from arm circumference and triceps skinfold: $EMC = AC - \pi TSKF$.

$$EMC = AC - \pi TSKF,$$

where AC = arm circumference and TSKF = triceps skinfold. Estimated muscle circumference has also been used as a measure of the lean body mass, in an effort to separate the lean and fat portions of body composition (Frisancho, 1974).

Interrelationships among the anthropometric measures were investigated using the pretest data (see Exhibit 5-2). For these analyses, correlation coefficients were calculated within each six-month age group and

Exhibit 5-2

Average Age-Specific Correlation Coefficients[a] Among Anthropometric Measures

	Weight	Weight for Height	Arm Circumference	Estimated Muscle Circumference	Triceps Skinfold
Height	.78	.31	.36	.39	.12[b]
Weight		.83	.68	.64	.43
Weight for Height[b]			.72	.63	.56
Arm Circumference				.89	.70
Estimated Muscle Circumference					.29

[a] Average correlations derived by combining age-specific coefficients using the z-transformation. Fewer significant chi-squared statistics indicating heterogeneity of age-specific correlations were observed than would be expected by chance ($p < .05$).

[b] Only correlation coefficient in this Exhibit not significantly different from zero ($p < .05$).

averaged across age groups using the z-transformation.* The resulting average correlation coefficients represent associations independent of age (without assuming age linearity) and are better estimates of the true associations than the coefficient for any single age group. Virtually all the variables were significantly correlated (triceps skinfold and height were the only exception). The degree of association also indicated considerable separate variation. Because the variables can be measured reliably, deviations of the correlations from unity provide additional information. For example, triceps skinfold thickness and weight correlate 0.43, suggesting that subcutaneous fat and weight are measuring rather different characteristics. Not surprisingly, height and weight were highly correlated (0.78), as were weight and weight for height (0.83), and arm circumference and estimated muscle circumference (0.89). Subcutaneous fat thickness over the triceps was moderately related to other soft-tissue measures, but fatness in this sample was not significantly related to height.

Analysis of Anthropometric Measures

Initially, the analyses compared the anthropometric measures of the children to standard reference percentiles, which are available for males and females separately at half-year intervals of age. Using this approach to compare Head Start and non-Head Start children in each site, however, encounters many small samples, so that results would tend to be unreliable. Thus, for most analyses in this report, the anthropometric measures were expressed as gender-and-age-specific percentiles, so that the data could readily be aggregated, especially across gender. For height, weight, and weight for height a computer program furnished by the Centers for Disease Control (CDC) was used to calculate exact percentiles relative to the National Center for

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*If r is a sample correlation coefficient, the z-transformation yields

$$z = 1/2[\log_e(1 + r) - \log_e(1 - r)],$$

whose distribution is almost normal with variance $1/(n-3)$, where n is the sample size. To combine values of z from samples of varying size, one forms the weighted average with weights $n_i - 3$, where n_i is the size of sample i. For further discussion, see Snedecor and Cochran (1967, Section 7.7).

Health Statistics reference data.* For triceps skinfold, arm circumference, and estimated muscle circumference percentiles derived from the U.S. Health and Nutrition Examination Survey by Frisancho (1981) were smoothed for these analyses (see Technical Appendix 2B).

The percentiles, calculated within groups defined by gender, were pooled for analyses across age and gender groups after determining that no systematic differences attributable to age or gender of the child were present. This pooling greatly facilitated analyses because of the very small sample sizes within groups defined by the combination of age, gender, and site.

The National Center for Health Statistics percentiles have been recommended for use with children from all ethnic groups although they were derived from a sample of black and white children. Within the age group considered, there is little evidence of differences between ethnic populations that could not be attributed to socio-economic or other environmental factors (Habicht et al., 1974). Because there was no evidence of a systematic ethnic difference in the Head Start Health Evaluation data, they were also pooled across ethnic groups.

The analyses for the anthropometry data primarily examined distribution statistics for the anthropometric indicators relative to the reference data, along with means and medians. Correlation coefficients were Pearson product-moment coefficients, and statistical significance was tested as significant difference from zero. Estimated rates of growth were calculated by linear regression.

The effect of Head Start on children's anthropometric status was investigated using multiple regression techniques. Regression models first adjusted for background covariates and site differences and then introduced an indicator variable for the Head Start treatment effect. Initial analyses considered a variety of covariates including: child's age, child's gender, child's race, per capita income, mother's education, family employment status, and mother's height. Only the following were found to be significant for more than one dependent variable across and within sites:

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*Normalized data based on Hammill et al., 1979.

- child's age;
- child's gender;
- child's race;
- mother's height; and
- pretest value (longitudinal analyses).

Mother's height, however, was available for fewer than half of the children; therefore two regression models were developed. The first model included only child's age, child's gender, and child's race (n=772), whereas the second included child's age, child's gender, child's race, and mother's height (n=376). Effects-coded variables were used to adjust for site differences (see Technical Appendix 2B). The dependent variables for both regression models were the z-scores of height, weight, weight for height, triceps skinfold thickness, arm circumference, and estimated muscle circumference. Specifically, the age-and-gender-specific means and standard deviations from the reference data were used to transform each child's measured values to a common scale.

In addition, a regression model for children in the longitudinal sample included the same covariates and site variables and posttest dependent measures (as the cross-sectional analyses), but also included pretest measurements as covariates. This model was used to examine the impact of Head Start on changes in children's growth from pretest to posttest.

Summary of Anthropometry Findings

Prevalences of Growth Problems

Summary statistics for percentiles of height, weight, and weight for height with ages and sexes combined were prepared by site for children at pretest (see Exhibit 5-3). The height percentiles of the children in Maricopa County and Mingo County were below the national reference data, suggesting a possible deficient nutritional or health status. In Greene and Humphreys Counties, children were average; children in Maricopa County were the shortest.

Exhibit 5-3

Anthropometric Percentiles at Pretest Relative to National Center for Health Statistics Charts

Anthropometric Measures	Pretested (Samples A and D) Children in:				
	Greene & Humphreys Counties (n=95)	St. Clair County (n=113)	Maricopa County (n=95)	Mingo County (n=73)	All Sites (n=376)
Height n	84	104	91	66	345
Mean Percentile	50.7	44.0	39.0	45.3	44.5
St. Deviation	24.2	27.0	22.3	26.1	25.2
Median Percentile	56.2	41.9	36.5	44.0	43.8
Weight n	85	104	89	66	344
Mean Percentile	52.4	48.2	48.6	52.1	50.1
St. Deviation	23.5	25.3	24.9	27.6	25.1
Median Percentile	56.4	49.8	45.2	54.2	50.1
Weight for Height n	84	103	88	65	340
Mean Percentile	56.3	56.0	58.9	59.0	57.4
St. Deviation	20.4	20.3	21,2	24.1	21.3
Median Percentile	59.0	58.5	58.5	61.5	59.4

At pretest, mean and median weight percentiles approximated the national median (50th percentile) in all sites. This pattern of height and weight status resulted in slightly elevated weight for height* in all sites.

Percentiles for height, weight, and weight for height at pretest were calculated by age group (6-month intervals) in each site. Results are graphically displayed in Exhibit 5-4. The pretest data suggest that as children grow older, both height and weight percentiles (relative to the national median) decrease slightly--that is, older children are further behind the national median than younger ones.

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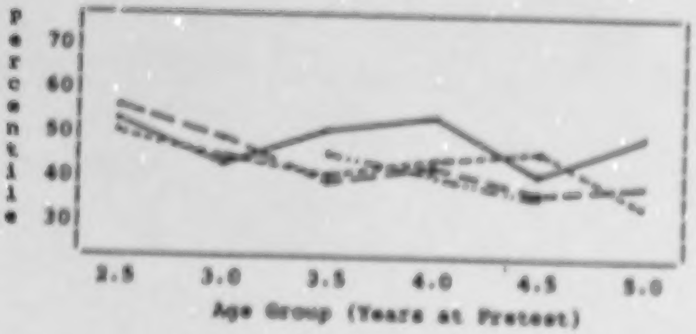
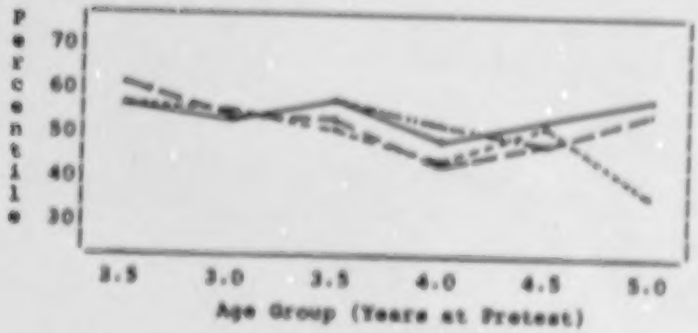
*Although the children tended to be short they were slightly heavier than children of the same height in the national sample.

Exhibit 5-4

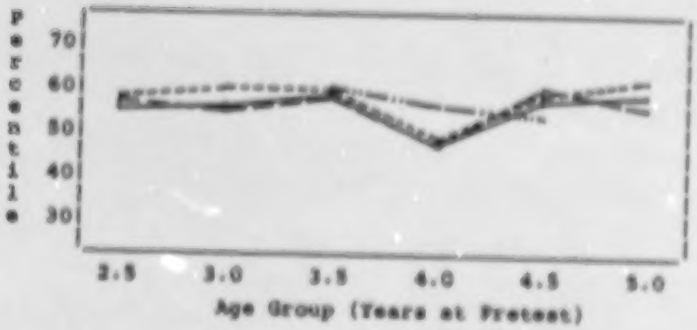
Growth Percentiles for Children by Age Group at Pretest



Height Percentiles



Weight Percentiles



Weight for Height Percentiles

Greene and Humphreys Counties ————
St. Clair County — —
Maricopa County —··—
Mingo County - - - -

We investigated the apparent slowdown in growth at pretest in the longitudinal sample; results are discussed in the impact section below.

Head Start Services Provided

One focus of the Head Start Health Evaluation has been to document services provided to children in each of the health domains, both through Head Start and through other sources. There are two services that are related to children's growth: nutrition services and physical examinations that monitor height and weight. The provision of nutrition services is discussed in Chapter Six, and the provision of physical examinations is presented in Chapter Three. Therefore, to avoid repetition, sections on Services Provided through Head Start, Services Provided through Other Sources, and Services Provided to Special Groups are not included in this chapter.

Impact of Head Start on Children's Growth

Longitudinal Analyses. The possibility that a decrease in growth that was observed for pretest children is due to a peculiarity of the pretest data is supported if one considers only the longitudinal sample of children. Graphs were prepared for these children (sample A) at pretest (Exhibit 5-5) and at posttest (Exhibit 5-6). Two facts are apparent. First, the longitudinal children at pretest do not display the downward trend in growth percentiles with age, which was observed for pretest children on average.* Second, the graphs are remarkably similar from pretest to posttest, indicating that children's growth patterns did not change very much over the intervening year.

Graphs also were prepared to illustrate changes in growth rates (z-scores), relative to national population estimates (see Exhibit 5-7). These figures indicate that at all age levels children in the longitudinal sample were growing somewhat more slowly than the average child in the United States, but there is no indication that their rate of growth, compared to

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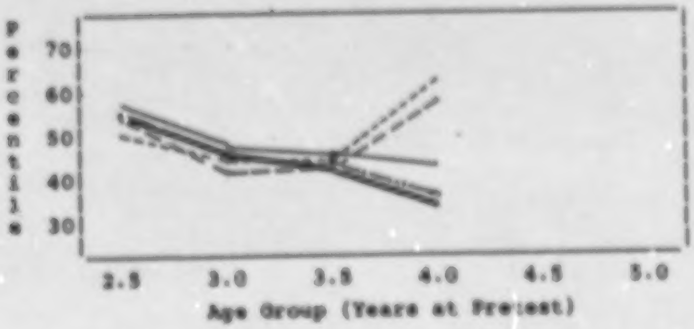
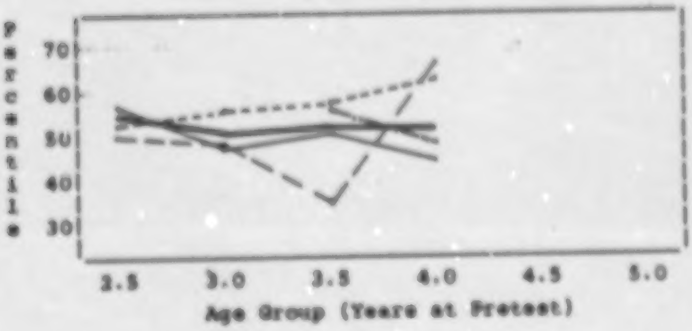
*This may be due to attrition which occurred from pretest to posttest, with children at a relatively lower socioeconomic status leaving the longitudinal sample.

Exhibit 5-5

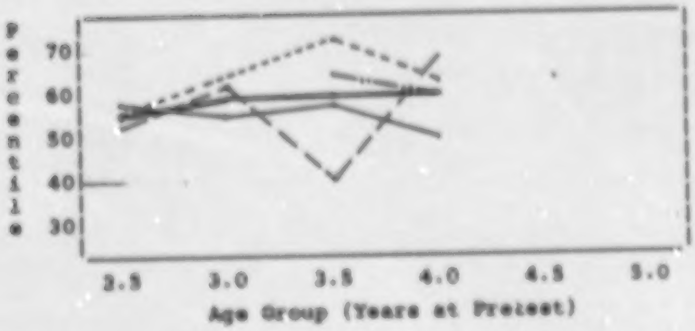
Growth Percentiles for Longitudinal Children by Age Group at Pretest



Height Percentiles



Weight Percentiles

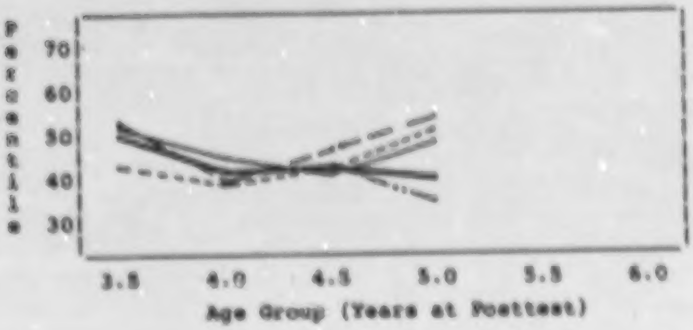


Weight for Height Percentiles

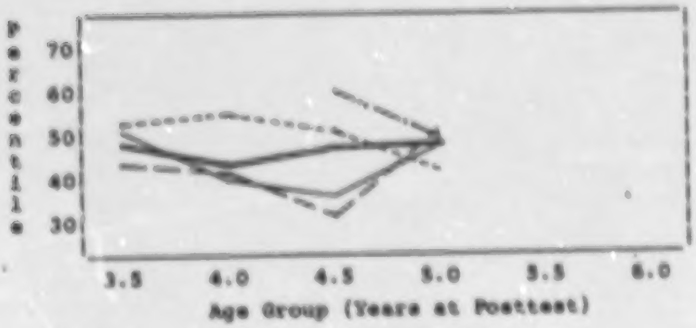
Greene and Humphreys Counties	———
St. Clair County	— —
Maricopa County	—‥—
Mingo County	- - - -
All Sites	━━━

Exhibit 3-6

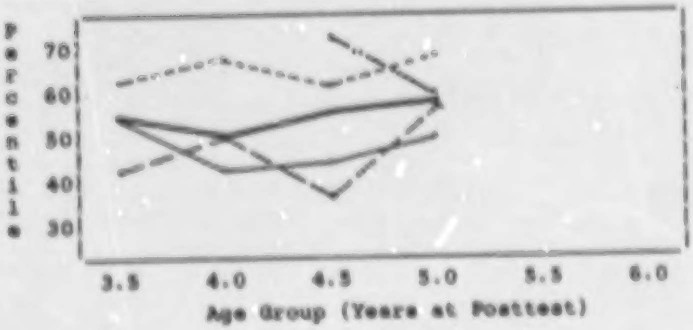
Growth Percentiles for Longitudinal Children by Age Group at Posttest



Height Percentiles



Weight Percentiles

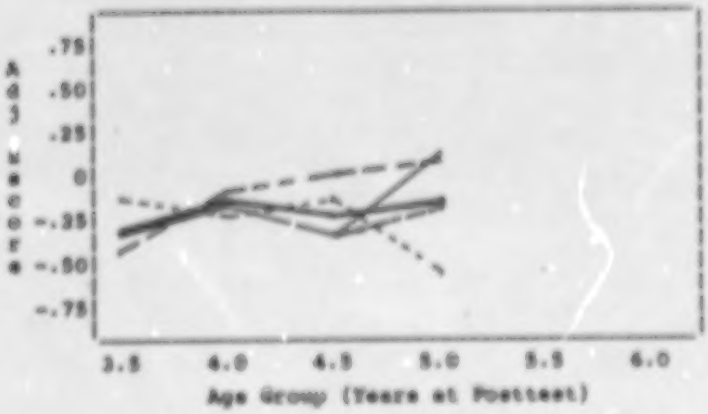


Weight for Height Percentiles

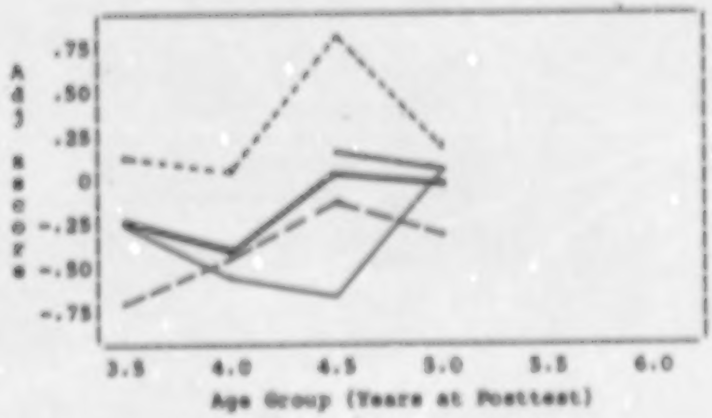
Greene and Humphreys Counties ———
St. Clair County — — —
Maricopa County — · · —
Mingo County - - - -
All Sites ━━━

Exhibit 5-7

Rate of Growth for Children in Longitudinal Sample (Adjusted for Gender-Specific National Standardized Data)[a]



Height



Weight

[a] $x_{post} - x_{pre}$ = expected correlation of pre-post score for age group

Greene and Humphreys Counties	———
St. Clair County	— —
Maricopa County	—·· —
Mingo County	– – – –
All Sites	━━━

to the expected rate of growth for children of the same gender, is slowing as they get older. In fact, the rate of weight gain is at the expected level for children who are over 4 years of age.

The effect that Head Start may have on children's anthropometric status was assessed through regression models both within and across sites. The results of these analyses are summarized in Exhibit 5-8 and Table 5-1 in the Appendix. Across sites, there was no significant ($p < .05$) Head Start effect for any outcome measure. Within sites, however, there are several significant effects, often in opposite directions. This divergence of results and a lack of findings across sites suggests that, across all ages, Head Start does not have a consistent impact on children's growth.

Exhibit 5-8

Head Start Impacts on Anthropometric Status
Summary of Regression Results

	Longitudinal (Sample A) Children in:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Posttest z-score controlling for pretest z-score (n=171)		HS>taller children, smaller triceps skinfold ($p < .05$)		HS>smaller arm circumference, smaller estimated muscle circumference ($p < .01$)	

Cross-Sectional Analyses. Exhibit 5-9 provides summary statistics for percentiles of height, weight, and weight for height with ages and sexes combined for children in the cross-sectional sample. The profile of anthropometric status of this group of children is somewhat different than that of the pretest sample (see Exhibit 5-3). In St. Clair County was there a marked increase in height percentiles from pretest (41.9 median) to posttest (49.5 median). In Greene and Humphreys Counties mean and median weight percentiles did not approximate the national median (50th percentile) in the cross-sectional sample; this was not the case in the pretest sample. Finally, children in Greene and Humphreys Counties and St. Clair County were slightly below the national reference norms for appropriate weight for their height.

Exhibit 5-9

Anthropometric Percentiles at Posttest Relative to National Center for Health Statistics Charts by Site

Anthropometric Measures	Posttested Children (Samples A, B, C) in:				
	Greene & Humphreys Counties (n=228)	St. Clair County (n=194)	Maricopa County (n=167)	Mingo County (n=228)	All Sites (n=817)
Height n	224	187	162	224	797
Mean Percentile	50.3	51.1	37.5	45.9	46.7
St. Deviation	25.1	24.0	25.8	23.3	25.0
Median Percentile	50.3	49.5	36.8	43.4	46.4
Weight n	224	187	167	225	803
Mean Percentile	44.9	48.2	51.9	53.9	49.6
St. Deviation	27.3	24.8	26.5	25.1	26.1
Median Percentile	42.6	45.8	52.0	54.0	49.3
Weight for Height n	224	186	162	223	795
Mean Percentile	45.0	49.3	62.7	61.4	54.2
St. Deviation	25.8	22.6	27.0	22.9	25.7
Median Percentile	44.0	46.4	64.2	61.6	55.6

Growth charts by age group and for children from families with per capita incomes of less than $1,295 are presented in Tables 5-2 and 5-3 in the Appendix. The results suggest that younger children from low-income families tend to be slightly behind national norms, but that, beginning around age four, children from such families are near the national norm.

This statement is further supported by the number of children who are below the 10th national percentile for height, weight, triceps skinfold thickness, arm circumference, and/or estimated muscle circumference (see Exhibit 5-10).* Only in Maricopa County, where slightly more children than expected were below the 10th percentile for height as well as arm circumference and estimated muscle circumference, is there some evidence that there may be a greater frequency than expected of children with a growth delay. In St. Clair County, where more children were below the 10th percentile than expected for arm circumference and estimated muscle circumference, fewer than expected were below the 10th percentile for height--a finding that suggests systematic group differences in physique or measurement error, but is not consistent with a finding of growth delay.

Some group differences were evident between the Head Start and the non-Head Start group. Prevalence of height below the 10th percentile in Maricopa County was significantly higher for the Head Start than non-Head Start group and weight for height over the 85th percentile. In Mingo County, non-Head Start chilaren were more likely to have triceps skinfold thickness over the 85th percentile than Head Start children, indicating that these children are heavier than expected from the reference data.

One straightforward indication of the children's growth status at posttest comes from plotting age- and gender-specific means of height and weight against the standard growth curves for these two variables. Preliminary examination revealed no differences among sites that approached significance, so the plots in Exhibits 5-11 through 5-14 reflect the combined data from the four sites. The number of observations underlying each point varies from 1 to 70, with the small sample sizes in the first three age intervals and the last age interval; from 3.5 to 5.5 years, however, each point is based on at least 24 observations. Overall, the four plots show both Head Start children and non-Head Start children close to the 50th percentile; the only points below the 25th percentile or above the 75th percentile come from rather small samples.

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*Table 5-4 in the Appendix presents distribution statistics according to age- and sex-specific z-scores by group and by site.

Exhibit 5-10

Prevalence of Growth Problems
Posttest Sample

Growth Problems		Posttested (Samples A,B,C) Children in:									
		Greene & Humphreys		St. Clair		Maricopa		Mingo		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
Height Below 10th Percentile	n %	5/123 4.1	5/101 5.0	4/105 3.8	7/82 8.5	29/101 28.7	1/61 1.6***	9/118 7.6	5/106 4.7	47/447 10.5	18/350 5.1**
Weight Below 10th Percentile	n %	8/123 6.5	12/101 11.9	5/105 4.8	8/82 9.8	5/106 4.7	2/61 3.3	4/119 3.4	4/106 3.8	22/453 4.9	26/350 7.4
Weight for Height Below 10th Percentile	n %	11/123 8.9	11/101 10.9	2/104 1.9	2/82 2.4	2/101 2.0	2/61 3.3	4/118 3.4	2/105 1.9	19/446 4.3	17/349 4.9
Triceps Skinfold Thickness Below 10th Percentile	n %	4/118 3.4	3/91 3.3	6/106 5.7	5/82 6.1	2/106 1.9	0/61	5/117 4.3	5/105 4.8	17/447 3.8	13/339 3.8
Arm Circumference Below 10th Percentile	n %	6/120 5.0	7/97 7.2	14/106 13.2	16/80 20.0	16/106 15.1	5/60 8.3	7/118 5.9	3/104 2.9	43/450 9.6	31/341 9.1
Estimated Muscle Circumference Below 10th Percentile	n %	10/118 8.4	7/91 7.7	13/106 12.3	13/80 16.3	32/105 30.1	11/60 18.3	4/117 3.4	0/104	59/445 13.2	31/335 9.3
Weight for Height Over 95th Percentile	n %	11/123 8.9	5/101 5.0	9/104 8.7	2/82 2.4	34/101 33.7	9/61 14.8**	13/118 11.0	19/105 18.1	67/446 15.0	35/349 10.0*
Triceps Skinfold Thickness Over 95th Percentile	n %	28/118 23.7	22/91 24.2	17/106 16.0	10/82 12.2	26/106 24.5	19/61 31.1	9/117 7.7	21/105 20.0*	80/447 17.9	72/339 21.2

*p < .05
**p < .01
***p < .001

Exhibit 3-11

Height of Head Start and non-Head Start Boys Compared to Standard Percentile Growth Curves, All Four Sites Combined

(H = Head Start, N = non-Head Start)

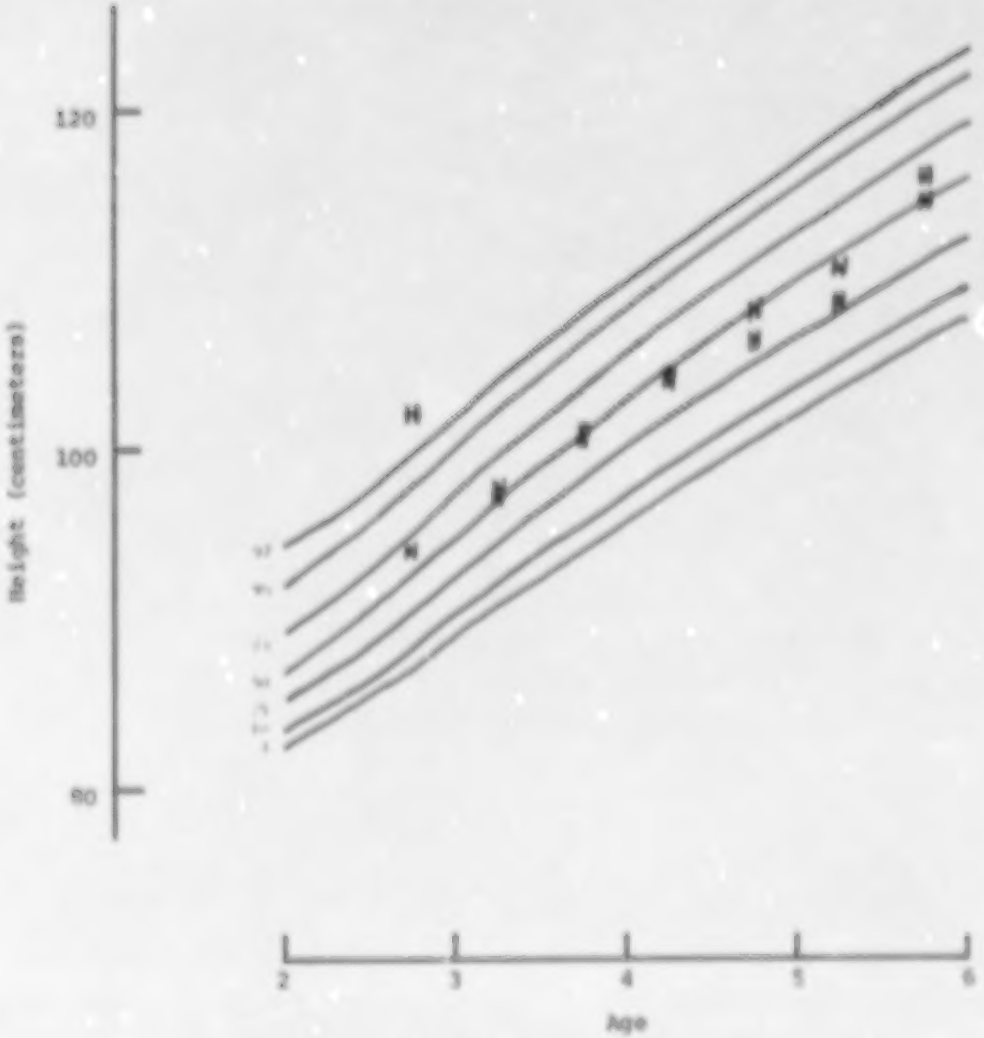


Exhibit 3-12

Weight of Head Start and non-Head Start Boys Compared to Standard Percentile Growth Curves, All Four Sites Combined

(H = Head Start, N = non-Head Start)

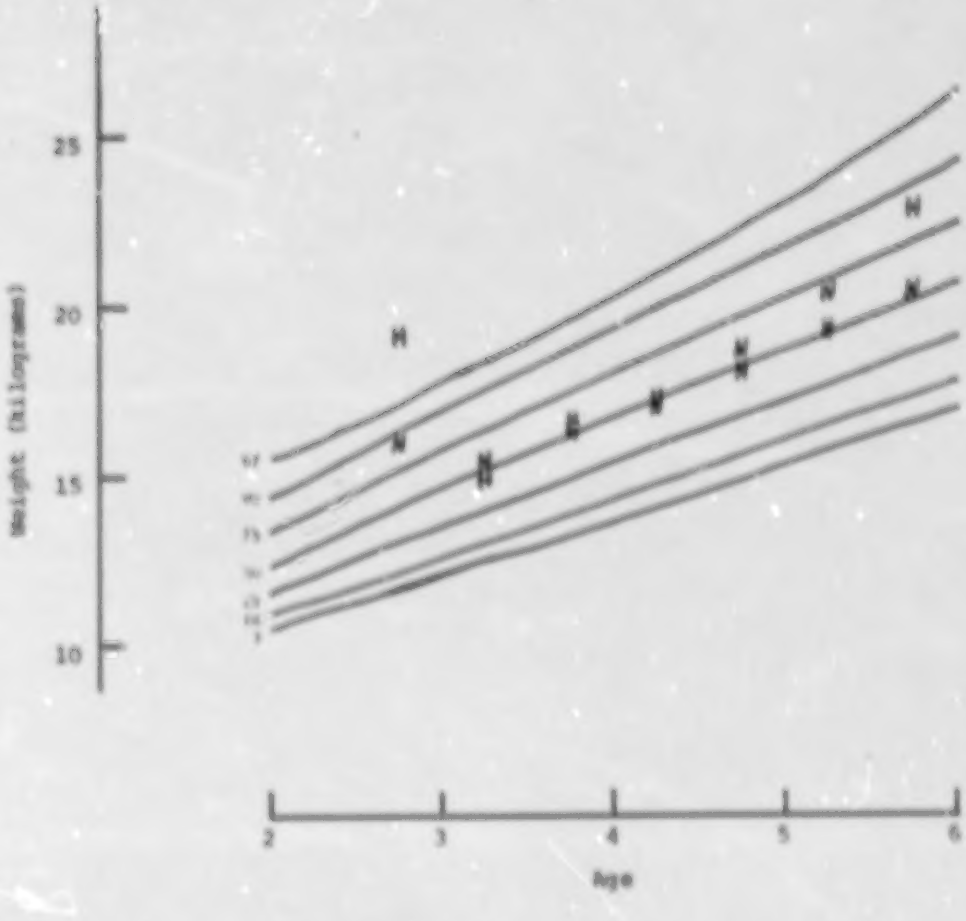


Exhibit 5-13

Height of Head Start and non-Head Start Girls Compared to Standard Percentile Growth Curves, All Four Sites Combined

(H = Head Start, N = non-Head Start)

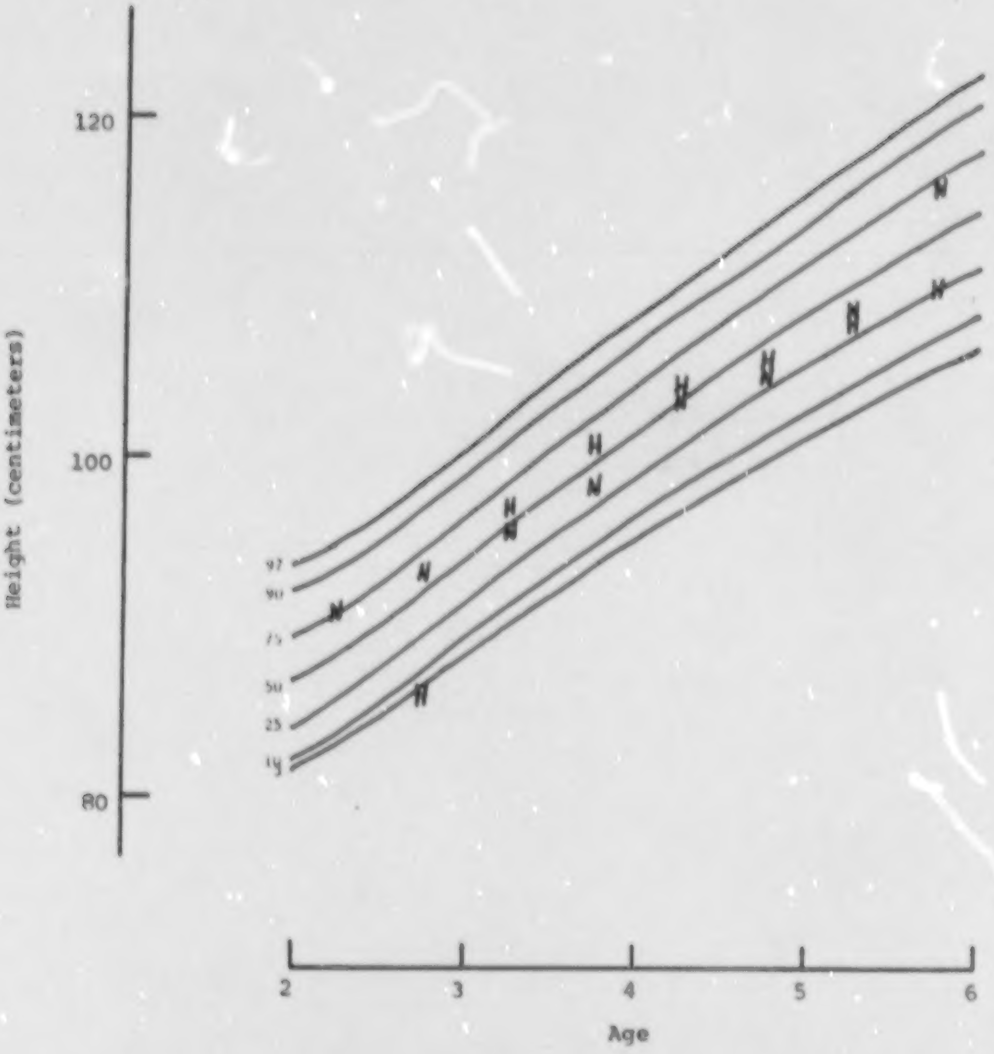
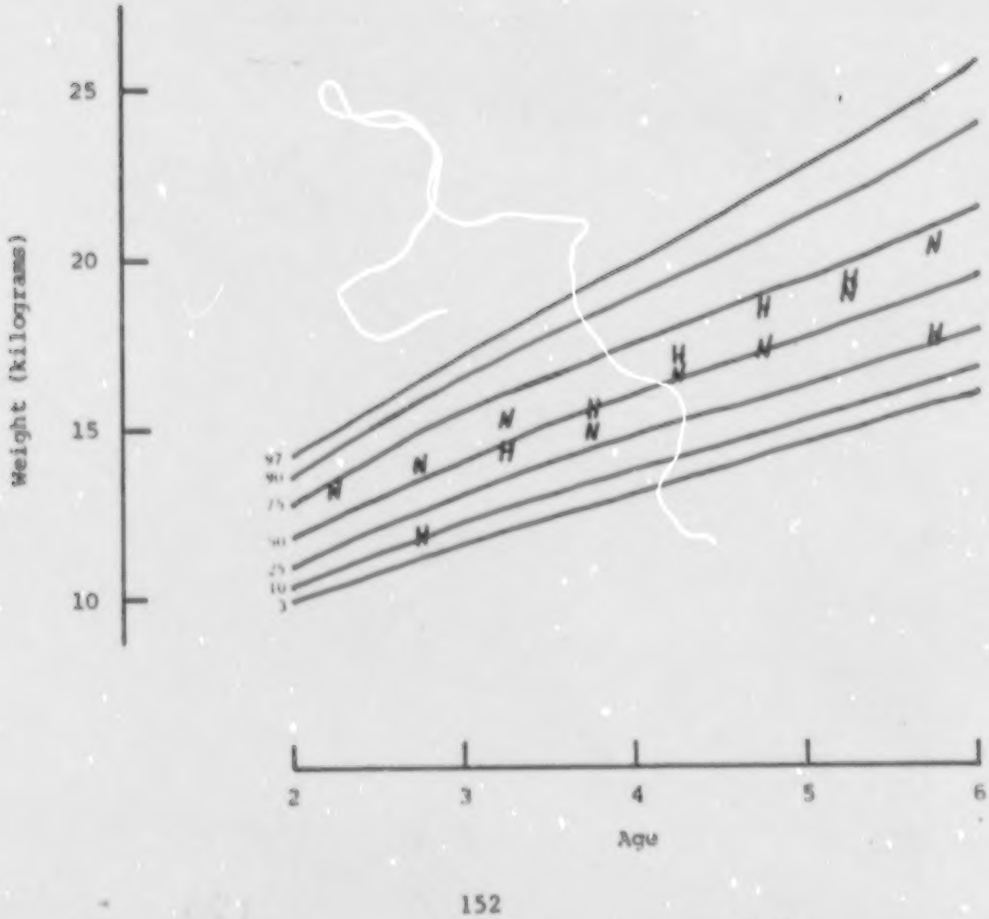


Exhibit 5-14

Weight of Head Start and non-Head Start Girls Compared to Standard Percentile Growth Curves, All Four Sites Combined

(H = Head Start, N = non-Head Start)



Results of regression analyses on the cross-sectional sample are summarized in Exhibit 5-15 and Tables 5-5 and 5-6 in the Appendix. As was the case in the longitudinal sample, there is no significant Head Start effect on any measure and the significant effects that were found within site were not consistent in direction.

Conclusions

The anthropometric analyses indicate that the growth status of study children, in general, is typical of most children in the United States. Except in Maricopa County fewer children are below the 10th percentile for height and weight than are found nationally. However, the rate of growth (height, weight) observed for children in the longitudinal sample is slightly below the national average. There also is evidence that, except in Mingo County, study children tend to be relatively heavy rather than muscular. Younger pretest children in the study tended to be behind national norms, but analyses of the posttest data indicated that after age four, children's average height and weight approach the 50th national percentile.

Although Head Start is significantly associated with one or more of the anthropometric measures in all sites, there is little consistency in direction and, therefore, few overall significant effects. The Head Start effects are stronger for children over four years of age.

Exhibit 5-15

Head Start Impacts on Anthropometric Status
Summary of Regression Results

Regression Analyses	Posttested Children (Samples A, B, C) in:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Cross-sectional Sample: z-scores (n=770)			HS -> shorter children, greater weight for height (p < .01)	HS -> taller children, less weight for height, smaller arm circumference (p < .05)	
Cross-sectional Sample: z-scores for children under 4 years (n=224)	HS -> greater estimated muscle circumference (p < .05)				
Cross-sectional sample: z-scores for children 4 years and older (n=546)		HS -> taller children (p < .05)	HS -> shorter children, greater weight for height (p < .01)[a]		

[a] Note: This is same sample as total cross-sectional sample since all children in Maricopa County are 4+ years old.

CHAPTER SIX

NUTRITION EVALUATION

Nutrition Indicators

The principal data collection methodology employed in the nutrition evaluation was the 24-hour recall, which obtained information on each child's food consumption during the previous 24 hours. A second observation-based data collection technique was used to obtain data on foods consumed by Head Start children during the hours they attended Head Start centers. Both of these methodologies are described in detail in the following pages.

Dietary intake data were used in calculating the total nutrient content of diets consumed by both Head Start and non-Head Start children. Nutrient intake data for Head Start children were calculated in both aggregated (24-hour totals) and disaggregated (nutrient contribution of meals consumed at Head Start separated from meals consumed at home) forms. Computation of these nutrient intake indicators and construction of related variables are fully described below.

Data Collection Methodologies

Twenty-Four-Hour Recall. A 24-hour recall yielded information on each child's food consumption during the previous 24 hours. Detailed data on all foods and beverages consumed by the child on the previous day were obtained from the child's mother or principal caregiver. When either mother or child was absent from the home for a period of time on the day of recall, so that mothers were unable to provide complete food consumption data, the appropriate person(s) (e.g., babysitter, grandparent, older sibling) was contacted for information on foods consumed by the child during the time period in question. Both telephone contacts and return-by-mail food-record forms were used in gathering these data.

A total of 25 data collectors were utilized in collecting dietary intake data over the course of the study. All data collectors had previous experience in basic nutrition interviewing techniques. Eighty percent were registered dietitians (R.D.) or R.D.-eligible, and all but six of the interviewers were masters-level nutritionists or nutrition students. Data collectors completed a four-day training session in which they were trained in collecting dietary intake information "second-hand" from mothers and other caregivers. A standardized interview protocol was adapted from that used in the First and Second National Health and Nutrition Examination Surveys (NHANES I and NHANES II). Graduated food models (also adapted from NHANES) were used with the 24-hour recall to help estimate quantities (portion sizes) of foods consumed. Following the NHANES protocol, interviews were conducted Tuesday through Saturday only (reported intake for Monday through Friday only), thereby excluding weekend food consumption data, which are more likely to be atypical.

Head Start Meal Observation. Because Head Start children were expected to be in Head Start classes on the day of recall, an observation methodology was used to obtain data on foods consumed by children during the hours they attended Head Start. The same group of trained nutrition interviewers collected detailed descriptions of all foods served, and then estimated amounts of foods consumed by each study child. Because these data would ultimately be combined with 24-hour recall data, the observation methodology was designed to be as similar to the 24-hour recall as possible. However, two major deviations in protocol were unavoidable:

- during Head Start meal observations, observers were able to record all foods as they were eaten. For the 24-hour recall, on the other hand, mothers were required to recall all foods eaten by their children on the previous day.
- food models were used in estimating portion sizes of non-standard food items reported in 24-hour recalls.* Use of these models in the Head Start classroom setting was not practical since each observer was responsible for observing two to six children at each meal. Observers therefore estimated the portion of food consumed by

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*Non-standard food items are foods that are not pre-portioned in any way (e.g., glasses of milk, servings of vegetables, pieces of meat). Standard food items are those that come in standard sizes and therefore do not require measurement with food models (e.g., brand name cookies and crackers, slices of sandwich bread, half-pint cartons of milk). Standard food items were recorded in the same fashion in both recalls and observations.

> each child based on the average portion of that food as served. Average portion sizes of foods as served were determined by weighing and measuring sample portions of food in the kitchen. (Observers were trained in a standardized manner for both the weighing and measuring and observation tasks.)

These variations in protocol present particular problems in interpretation of the data because the observation methodology was utilized only for meals and snacks served in Head Start centers. Findings must therefore be considered in light of this mixed methodology and the possibility that any differences noted between Head Start and non-Head Start groups may be an artifact of the observation methodology. Analyses addressing this issue have yielded promising results and are discussed in Appendix Note 6-1. Based on these exploratory analyses we are confident that positive Head Start findings presented in this chapter are not artifacts of the mixed methodology used in collecting Head Start children's dietary intake data.

Construction of Nutrition Variables

The total nutrient content of foods consumed by each child during the previous 24-hour period was calculated using the USDA Nationwide Food Consumption Survey (NFCS) nutrient data base and other standard USDA references on nutrient composition.* In addition to total energy intake (calories), protein, carbohydrate, fat, and cholesterol, the intake of seven vitamins and four minerals were also evaluated. These nutrients are listed in Exhibit 6-1.

In order to accurately describe the nutrition services provided by Head Start and the impact of these services on the nutrient intake of participating children, it was necessary to differentiate between nutrients received from foods provided by Head Start and those received from foods consumed at home. Therefore, the total nutrient content of foods consumed in each setting was calculated separately. These values were then summed to provide accurate 24-hour totals for Head Start children. The percentage

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*Cholesterol data were obtained from USDA Nutrient Data Base for Standard Reference, Release 1.

Exhibit 6-1

Nutrients Examined in Nutrition Evaluation

- Calories
- Protein (gm)
- Fat (gm)
- Carbohydrate (gm)
- Calcium (mg)
- Iron (mg)
- Magnesium (mg)
- Phosphorus (mg)
- Vitamin A (I.U.)[a]
- Thiamin (mg)
- Riboflavin (mg)
- Niacin (mg)[b]
- Vitamin B_6 (mg)[c]
- Vitamin B_{12}(mcg)[c]
- Vitamin C (mg)
- Cholesterol (mg)[d]

[a] Total Vitamin A value.

[b] Preformed niacin.

[c] Food composition data for these nutrients are somewhat less complete and reliable--results should be interpreted with caution.

[d] Not included in USDA-NFCS nutrient composition data base. Data obtained from USDA Nutrient Data Base for Standard Reference, Release 1.

of each child's total daily intake that was provided by Head Start meals and snacks was also computed.

Total nutrient intake variables were used in computing three other major classes of nutrition variables:

- percentage of daily nutrient intake standard provided;
- nutrient density (nutrient per 1000 calories); and
- nutrient sources of food energy (proportion of calories from protein, fat, and carbohydrate).

These variables and the steps involved in their construction are outlined below. Exhibit 6-2 summarizes the major variable categories utilized in the nutrition analyses.

Percentage of Daily Nutrient Intake Standard Provided. Nutrient intake standards used in the nutrition evaluation were in large part based on the 1980 Recommended Dietary Allowances (RDAs). The RDAs are recommended levels of intake for population groups, and thus are appropriate benchmarks to use in identifying groups who may be at risk of consuming marginal or inadequate amounts of essential nutrients. The temptation to identify adequate or inadequate individual nutrient intakes should be avoided, however. The practice of evaluating nutrient intake data in this manner, though somewhat commonplace, is an invalid use of the standards and frequently overestimates the prevalence of truly deficient intakes (Hegsted, 1975). (For a more detailed discussion of this issue, refer to Appendix Note 6-2.)

The standards used in the nutrition evaluation are listed in Appendix Note 6-3. Standards are included for children two to three years of age and four to six years of age.* Standards for calories and protein were adjusted for body weight, because individual requirements are closely related to total body size. Similarly, standards for thiamin, riboflavin and niacin were adjusted for total caloric intake because each of these nutrients is intimately involved in energy metabolism, and requirements are therefore approximately proportional to caloric intake. Adjustments were based on those used in the NHANES surveys and the Ten State Nutrition Survey and

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*RDAs for these age groups do not differentiate males and females. Therefore, the same set of standards was used for both sexes.

Exhibit 6-2

Variable Categories Used in Nutrition Evaluation

	Variable Categories	
24-Hour (Total Intake)	Head Start Meals and Snacks	Diet Consumed at Home
Total nutrient intake	Nutrient intake from Head Start meals and snacks Percent of total daily intake provided by Head Start meals and snacks	Nutrient intake from diet consumed at home Percent of total daily intake provided by diet consumed at home
Percent of daily nutrient intake standards provided by total diet	Percent of daily nutrient intake standards provided by Head Start meals and snacks	Percent of daily nutrient intake standards provided by diet consumed at home
Nutrient density of total diet	Nutrient density of Head Start meals and snacks	Nutrient density of diet consumed at home
Nutrient sources of food energy in the total diet	Nutrient sources of food energy from Head Start meals and snacks	Nutrient sources of food energy in diet consumed at home

closely approximate the 1980 RDA standards. The reference standard for cholesterol is the one most commonly used in evaluation of dietary intake (Hegsted, 1982; Pipes, 1982) because no RDA for cholesterol has been established. Although the role of cholesterol in the diet is still controversial, particularly for young children, this reference standard is generally used for adults and children over two years of age (Pipes, 1977; Pipes 1982).

The percentage of the age-appropriate standard provided in each child's total 24-hour intake was calculated for each nutrient. Similarly, the percentage of each standard provided by Head Start meals and snacks and meals and snacks consumed at home were computed.

Nutrient Density. Many of today's major public health nutrition concerns are essentially the converse of earlier nutrition concerns, in that contemporary nutrition problems are often the result of excesses in the diet rather than deficiencies (Dwyer, 1981; Hegsted, 1982). Excess consumption of calories, fat and refined carbohydrates and their potential role in the major chronic diseases affecting the U.S. population have been the target of many public- and private-sector nutrition education efforts (Dywer, 1981; Hegsted, 1982; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 1980). Food habits developed in early childhood may form the foundation for food habits throughout life. Thus, excess consumption of foods high in calories, fat or refined carbohydrates (sugar) during childhood may be the first link in a lifelong chain of poor eating habits, weight problems and other health problems (Dwyer, 1981; Pipes, 1982).

Diets lower than average in nutrient density may be indicative of such problematic consumption patterns. Nutrient density, or the relationship between calories and nutrients provided by the diet, reflects the general quality of the diet (Sorenson and Hansen, 1975). By examining this relationship in conjunction with the percentage of the recommended intake received for each nutrient, one gains insight into possible causes for differences in total nutrient intake among groups.

Nutrient density assesses the amount of a given nutrient received per calorie consumed. Nutrient densities are most commonly expressed as nutrient intake per 1000 calories:

$$\frac{\text{total nutrient intake}}{\text{total caloric intake}} \times 1000.$$

Nutrient densities were computed for total 24-hour intake, Head Start meals and snacks, and at-home diets. Data were compared to the nutrient density profile for the standard RDA-reference diet; these reference nutrient density values are presented in Appendix Note 6-3.

Nutrient Sources of Food Energy. Food energy (calories) in the diets of preschool children comes from three major sources--protein, fat, and carbohydrate. An assessment of the proportion of calories provided by each of these major nutrients provides further insight into diet quality, particularly in the case of fat and carbohydrate intake, since excess consumption of fat and refined carbohydrates (sugar) generally results in poorly balanced diets and many be related to development of chronic diseases later in life (Hegsted, 1982; U.S. Department of Health and Human Services, 1980). The percent contribution of each of the major energy-yielding nutrients was computed for total caloric intake as well as for calories provided by Head Start meals and snacks and those consumed at home.

Analysis of Nutrition Indicators

Preliminary Examination of Data

Preceding analysis, visual and numerical examination of the data (primarily one variable at a time, using the techniques discussed in Appendix 2B) ensured that anomalous distributions and data values would not go undetected. When a visual display of the data indicated the possibility of anomalous or outlying values, the basic numerical criterion described in Appendix 2B was used to further evaluate the data and decide whether to treat an individual observation as an outlier. The general preference (in applying judgment to possible outliers) was to retain data for analysis whenever possible. Thus, a clear break in the sample that distinguished one or more possibly anomalous values generally resulted in their being treated as outliers and excluded from any analysis involving means or tests of mean differences.

Vitamins A and B_{12}, as total intake values and as percentages of the nutrient intake standards, had substantially skewed distributions and required transformation to the logarithmic scale. For ease in interpretation and comparison to other data sets all tables included in this report display both the untransformed and log values for vitamins A and B_{12}. Final decisions about outliers for vitamin A and vitamin B_{12} were made after transformation to the logarithmic scale since, depending on the shape of the sample, a transformation can change the status of an observation from outlying to non-outlying or vice versa.

Handling of Unsatisfactory Data

Collection of dietary intake data, particularly data obtained from mothers about their children, inevitably results in a certain number of incomplete, unreliable, or unsatisfactory records. Since it is extremely important that all food consumption data be complete and accurate, these cases must be carefully identified and excluded from group analyses. Sixty-two such cases (out of the total 810 cases) were excluded from these analyses, for three major reasons:

- the mother or principal caregiver was away from the child for extended periods of time and was thus unable to provide complete information on the previous day's intake;
- the reported intake was identified by the mother or principal caregiver to be highly atypical due to illness, family circumstances, or other causes;
- data were judged unsatisfactory by data collector or field supervisor because of poor respondent reliability (e.g., respondent was reticent or nonresponsive, respondent was not a person who usually cares for the child, or respondent did not comprehend the purpose of the interview).

Head Start Subgroups

As previously mentioned, Head Start children were expected to be attending Head Start classes on the day to be reflected in the 24-hour recall. The appointment for each child's health assessment was therefore scheduled so that each Head Start child would be observed on the day before his/her appointment. The combination of Head Start meal observation and 24-hour recall interview information would then provide complete data on the previous 24-hour period. This plan worked quite well in the majority of cases; however, normal attendance fluctuations and appointment changes resulted in three separate subgroups of Head Start children:

- 27 children for whom no Head Start meal observation data were obtained. This problem occurred most frequently when mothers rearranged their pre-scheduled appointments and brought the child for his/her health assessment a day early or a day late;
- 54 children who were absent from Head Start on the day of scheduled observation, but kept their scheduled appointment for the health assessment.* Hence, the intake reported for the previous 24-hour period for these Head Start children did not include Head Start meals or snacks;
- 68 children who were present in Head Start on the scheduled observation day, but did not come for their health assessment until a later date. The 24-hour recall obtained at this time covered a time period when the child had not attended Head Start, either because he/she was absent or did not normally attend Head Start every day of the week.*,**

Two different approaches were taken in handling these special subgroups of children. First, for the 27 cases where Head Start meal observations were not completed, nutrient data were imputed. Data from observations of children attending the same Head Start center were used to determine imputed values. A value was imputed only if there were at least five other observations available in the appropriate Head Start center. Since mean values for particular nutrients can be strongly influenced by valid but high intakes, the median value was used in imputing data. Imputing nutrient intake data for missing Head Start meal observations was felt to be a valid and reliable procedure since complete and accurate data on foods served, as well as typical consumption behaviors, were available from observations of other children in the same center.

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*Children who had been ill on the day of recall have been excluded from the analyses (see preceding section on handling of unsatisfactory data). The numbers reported here include only those children whose absence was not related to an illness or other incident that might have affected their usual food consumption at home.

**The Head Start meal observations for these 68 children, though valid, were not included in further analysis since they were not compatible with their 24-hour recalls.

The two groups of children who were not present in Head Start on the day of recall presented a more difficult problem. Since the 24-hour recall data obtained for these children was complete but did not include any meals or snacks provided by Head Start, their nutrient intake data reflected a food consumption pattern that was potentially quite different from that of the rest of the Head Start children.* For this reason, the two subgroups of children who were not present in Head Start on the day of recall have been kept separate from the main Head Start group for all nutrition-related analyses. This distinction is reasonable since the main Head Start nutrition "treatment" was provision of food (and nutrients) through Head Start meals and snacks--meals and snacks that were not consumed by the absent children in the 24-hour period on which their nutrient intake data was based. Although these subgroups of children were not a part of the original study design, they provide an opportunity for several analyses that may shed light on important practical problems. For example, examination of the nutrient intake of these children gives a partial indication of what Head Start parents feed their children in the absence of Head Start. Thus, these children form an "accidental" comparison group whose differences from the regular Head Start group may help fill out our picture of Head Start's contribution to the nutrient content and nutritional quality of participating children's diets.

Analysis of nutrient intake data and appropriate background variables revealed no significant differences between the two groups of absent children. The two subgroups were therefore combined for all subsequent analyses and are identified as the Head Start-absent group. Exhibit 6-3 summarizes the subgroups of Head Start children used in the nutrition analyses.

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*It is important to reiterate that these subgroups did not include children who had been ill on the day of recall. Only those children whose absence was not related to an incident that may have affected food consumption at home were retained in the analyses. For many children, this "absence" was a routine one, since many children did not attend Head Start every day of the week, even if they were enrolled in a five-day program.

Exhibit 6-3

Groups of Children Included in Nutrition Analyses

Group	Nutrition Data Sources	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start-Present	Recall and Observation	107	66	54	58	285
	Recall and Imputed Observation	3	6	4	14	27
Head Start-Absent	Recall and Incompatible Observation	6	24	28	10	68
	Recall only	4	8	13	29	54
Non-Head Start	Recall only	90	68	52	104	314
Total		210	172	151	215	748

The Analytic Approach

The prevalence of nutrition problems in the pretest sample established baseline nutrition profiles for children in each site prior to Head Start intervention. Unadjusted group means for each nutrient were compared to the reference nutrient intake standards (see Appendix Note 6-3) to assess the prevalence of potentially inadequate nutrient intakes.* Groups with the greatest potential risk of deficient nutrient intakes were identified as those whose mean intake for any nutrient fell below 100 percent of the recommended intake. Since the potential risk for individuals within a group increases as the mean intake falls further below the recommendation, the extent to which the mean intake fell below 100 percent of the daily recommendation was also examined. Findings were then compared to reference data for comparable groups of children.

To determine Head Start impacts, unadjusted data were examined first, to detect major differences among groups. Impacts were further validated through use of multiple regression analysis, as described in Appendix 2B in which other potentially influential factors were taken into account. In particular, the fact that children in the Head Start group tended to be older than children in the non-Head Start group (see Chapter Two) warranted some attention. If older children consistently consumed more food than younger children (not an unrealistic expectation), any Head Start effect detected in the unadjusted comparisons could conceivably be an artifact of the age differences between groups. Similarly, variations in income (family's employment status served as a proxy for income in these analyses) or access to food assistance benefits might also influence the validity of unadjusted findings.

The regression model for the nutrition analyses was developed by carefully examining the effect of several potential covariates. Total (24-hour) nutrient intake variables were used as the principal dependent variables in developing the model. Covariates included in the final analytic model for the nutrition analyses are:

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*As previously discussed, obvious outlying or anomalous nutrient intake values were excluded from analyses involving means or tests of mean differences. The problem of disproportionate influence of single intakes on the mean value still exists, however, because some nutrients are heavily concentrated in particular foods. Examining the mean intake in light of the full distribution of intakes within the population group may provide a more accurate picture.

- child's age;
- child's sex;
- family employment status -- (1) if any member of the child's household was employed, 0 (zero) if otherwise); and
- household participation in federal food assistance programs -- 0 (zero) = no participation; 1 = participated in Food Stamps only; 2 = participated in WIC only; 3 = participated in both Food Stamps and WIC.

Several other potential covariates, including child's weight and height*, child's race, mother's education, family's per capita income and wave of recruitment (Samples A, B and C) were considered but were found to have no significant influence on the regression model. Only those variables found to be significantly associated with intake of at least three nutrients in either across- or within-site analyses were included.**

Head Start impacts were evaluated for the longitudinal sample (Sample A) and the full cross-sectional sample (Samples A, B and C) both within and across sites. Regression analyses were conducted for all three categories of dependent nutrition measures: nutrient intake, nutrient density, and proportion of calories provided by protein, fat and carbohydrate. All regression analyses were structured so that potential Head Start effects would be measured last, after the contributions of all other factors and covariates had been considered. Therefore, the covariates and factors were entered into the regression equation in a fixed sequence: first, the covariates (child's age, child's sex, family employment status, and household participation in federal food assistance programs), and then a three-level Head Start factor (Head Start-present, Head Start-absent and non-Head Start).*** In analyses of the longitudinal sample (Sample A) the pretest measure for each nutrient was added to the covariate list to adjust for nutrient intake at pretest. In analyses run across all sites, the factor for site effects was entered into the equation just prior to the Head Start factor.

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*It was found that the combination of child's age and child's sex was a more significant predictor across a range of nutrient intake variables than was child's weight or height.

**Detailed breakdowns of nutrient intake data for the cross-sectional sample by age, sex and wave of recruitment, are available in Tables 6-36 through 6-52.

***See Appendix Note 6-4 for a detailed description of the coding scheme used in structuring multiple regressions to compare these three groups of children.

Summary of Findings

Prevalence of Nutrition Problems at Pretest

Nutrition problems in the pretest sample (Samples A and D) were assessed on two levels:

- prevalence of potential risk for inadequate or marginal intake of particular nutrients; and
- prevalence of poorly balanced diets, as evidenced by below-average nutrient densities or proportion of calories obtained from protein, fat, and carbohydrate.

Prevalence of inadequate or marginal nutrient intakes were identified on the basis of unadjusted group means. In order to provide a more complete description of nutrition problems and to gain some insight into the variability in intakes both within and among sites, the distribution of percentage of the daily recommended intake received was also evaluated for each nutrient. Samples were partitioned into four categories; the following intervals were used:

- 0 to 33 percent of recommended intake;
- 34 to 66 percent of recommended intake;
- 67 to 99 percent of recommended intake; and
- 100 percent or more of recommended intake.

Although children receiving less than 100 percent of the daily recommendation are not necessarily consuming an inadequate diet (see Appendix Note 6-2), the risk of inadequate intakes within a population group clearly decreases as the intakes of more children approach or exceed 100 percent of the recommendation.

The prevalence of poorly balanced diets was evaluated using the nutrient density data. In keeping with the approach outlined above, both mean values and full distributions were examined for each nutrient. Nutrient densities of the RDA-reference diet were used as benchmarks. Groups with the greatest potential risk for poorly balanced diets were identified as those whose mean density for any nutrient fell below the RDA reference standard. Prevalence of nutrient density problems was further described by evaluating the percentage of children in each group who had consumed diets with nutrient densities below the RDA reference standards.

Prevalence of Potential Risk for Marginal or Inadequate Nutrient Intakes. Exhibit 6-4 illustrates the pattern of marginal nutrient intakes noted within and across sites in the pretest sample. (A more complete description of the data, including means, medians and extremes is presented in Table 6-1.) As Exhibit 6-4 illustrates, mean intakes of pretested children in all sites met or exceeded 100 percent of the daily recommendation for protein, vitamin A, thiamin, riboflavin, vitamin B_{12} and vitamin C. The most problematic nutrients in all sites were calcium and iron. The mean intake for both of these nutrients was well below 100 percent of the recommendation in all sites with the exception of calcium intake in Mingo County. The degree of inadequacy varied across sites, with children in Greene and Humphreys Counties consuming the most inadequate diets, receiving, on the average, less than 70 percent of the recommended amount of both calcium and iron.

In general, caloric intakes were adequate, with the exception of children in Greene and Humphreys Counties and Maricopa County. This finding is especially noteworthy because the caloric standard was individually adjusted for each child's body weight, and therefore is a more accurate reflection of individual children's requirements than other nutrient intake standards may be.

Children in Maricopa County also had mean intakes below 100 percent of the recommended intake for niacin and vitamin B_6. The standard for niacin was adjusted for each individual child's caloric intake and therefore, similar to the caloric standard, reflected a more accurate estimation of the children's individual needs. The seemingly deficient intake of niacin is less important, however, since it is based only on the amount of preformed niacin in the diet. The body can also obtain niacin from tryptophan, an

Exhibit 6-4

Unadjusted Mean Nutrient Intakes Below 100 Percent of Recommended Daily Intake for Pretested Children by Site

Nutrient	Pretested Children (Samples A and D) in:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Calories	+		++		
Protein					
Calcium	++++	+++	++		+++
Iron	++++	++	++++	+++	++++
Magnesium	+		++		
Phosphorus	++				
Vitamin A					
Thiamin					
Riboflavin					
Niacin			+		
Vitamin B_6			++		
Vitamin B_{12}					
Vitamin C					

+ 90-99% of recommended intake

++ 80-89% of recommended intake

+++ 70-79% of recommended intake

++++ Below 70% of recommended intake

amino acid in protein foods.* Since the mean protein intake of children in Maricopa County was more than adequate to meet their needs, it is reasonable to assume that a significant amount of tryptophan was available for conversion to niacin.

The marginal vitamin B_6 intake in Maricopa County should also be interpreted with caution. Nutrient composition data for vitamin B_6 are less complete than for other nutrients (Food and Nutrition Board, National Academy of Sciences, 1980). Some of the richest food sources of vitamin B_6 are meats, fish and poultry. It is interesting to note that over 60 percent of the children in Maricopa County were Hispanic and may consume a diet typical of this ethnic group and lower than average in amounts of meat, fish and poultry.** It appears then that the decreased calorie, protein and vitamin B_6 intakes of children in this site may be interrelated and the result of a diet that focuses on alternative protein sources (grains and legumes) rather than meat, fish and poultry.

The significance of the marginal intake of magnesium noted in Greene and Humphreys Counties and Maricopa County is difficult to estimate. This mineral occurs widely in almost all foods, and although low-income populations have previously been noted to consume marginal levels of this nutrient (Hegsted, 1982), actual (clinical) deficiencies of magnesium are rare (Food and Nutrition Board, National Academy of Sciences, 1980).

The patterns of marginal nutrient intake noted for the pretest sample are similar to those of comparable groups of children evaluated in several other major nutrition and/or health surveys (see Exhibit 6-5). Corroborating the findings discussed here, calcium and iron were also the most problematic nutrients in the other surveys. Overall, prevalence and severity of marginal intakes in the pretest population were somewhat greater than would be expected from these reference data, particularly in Greene and Humphreys

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*Proteins of animal origin contain approximately 1.4 percent tryptophan; vegetable source proteins contain approximately 1 percent tryptophan; corn products, a poor source of tryptophan contain less than 0.6 percent tryptophan. (Food and Nutrition Board, National Academy of Sciences, 1980).

**As Table 6-1 indicates, children in Maricopa County consumed substantially lower amounts of protein than children in the other three sites. Nonetheless, on the average, their protein intake was more than adequate to meet their needs.

Exhibit 6-5

Unadjusted Mean Nutrient Intakes below 100 Percent of Recommended Daily Intake for Children Evaluated in the USDA Nationwide Food Consumption Survey (NFCS), First National Health and Nutrition Examination Survey (NHANES-I), and Ten State Nutrition Survey (TSNS)[a]

Nutrient	NFCS[b] n=51	NHANES-I[c] n=627	TSNS[d] n=278
Calories	+		
Protein			
Calcium	+		++
Iron	++	+++	++++
Magnesium	+	not available	not available
Phosphorus		not available	not available
Vitamin A			
Thiamin			
Riboflavin			
Niacin			+
Vitamin B_6	+	not available	not available
Vitamin B_{12}		not available	not available
Vitamin C			+

+	90-99% of recommended intake
++	80-89% of recommended intake
+++	70-79% of recommended intake
++++	Below 70% of recommended intake

Actual data from each of these surveys are presented in Table 6-2.

[a] Data from the Preschool Nutrition Survey (1968-1970), a seemingly obvious group for comparison, are not included here or in the appendix. Nutrient intake data from this survey included the contributions made by vitamin supplements. Dietary data for the present study and the studies summarized above do not include nutrients received from vitamin supplementation.

[b] Conducted 1977-1978. Data shown here include only children (aged three to five years) of families with incomes below $6,000/year.

[c] Conducted 1971-1974. Data shown here include only children of low-income families. Based on weighted averages of values for two- to three-year old children and four- to six-year old children.

[d] Conducted 1968-1970. Data shown here include only children (aged two to three years) from low-income ratio states.

Counties and Maricopa County. Interestingly, the problem of vitamin C intake noted in the Ten-State Nutrition Survey was not replicated in the present evaluation, nor in the two other more recent surveys included in Exhibit 6-5. The Ten-State findings sparked a great deal of nutrition education and food fortification aimed at improving vitamin C intake in preschool children. The problem seems to have diminished, at least on the basis of mean intakes of vitamin C in the particular groups of preschool children evaluated here.

In summary, the prevalence of marginal nutrient intakes at pretest, as measured by mean intakes within each site, was similar to, although somewhat more severe (in degree of shortfall of mean nutrient intake), than what one would expect from appropriate reference data. Problems appeared to be most pronounced in Greene and Humphreys Counties and Maricopa County. Diets of all pretested children were marginal in calcium and iron. Intakes of phosphorus, magnesium and vitamin B_6 were also low in some sites. Children in Greene and Humphreys Counties and Maricopa County also consumed diets that were marginal in total calories. Mean intakes of all other nutrients exceeded 100 percent of the daily recommendations.

In order to more fully describe the baseline diets of the Head Start-eligible children evaluated at pretest, the distribution of percent of nutrient intake standard received was evaluated for each nutrient, both across and within sites, using the four intervals described previously. These data are displayed in Exhibit 6-6.

Over 90 percent of the children in all sites consumed diets providing 100 percent or more of the recommended amount of protein and thiamin. For all other nutrients, most notably calcium and iron, varying percentages of children consumed diets supplying less than 66 percent of the recommendation. Children in Greene and Humphreys Counties consumed diets supplying the least calcium, iron, phosphorus, vitamin B_{12} and vitamin C, as evidenced by greater numbers of children in this site appearing in the lower ends of the distributions (0-66%) for these nutrients. Children in St. Clair and Mingo Counties tended to consume diets higher in most nutrients, with fewer children appearing in the lower ends of the distributions.

Although neither the data from 24-hour recalls nor the reference nutrient intake standards allow us to interpret the implications of intakes below 100 percent of the standard for any individual child, the pattern of

Exhibit 6-6

Percent of Nutrient Intake Standards Received for Pretested Children By Site

Nutrients	Percent of Pretested Children (Samples A and D) In:				
	Greene & Humphreys Counties n=75	St. Clair County n=94	Maricopa County n=90	Mingo County n=63	All Sites n=322
Calories					
0 - 33%	0	1	1	0	0.50
34 - 66%	9	5	10	7	7.75
67 - 99%	39	23	42	18	30.50
100%+	52	71	47	75	61.25
Protein (mg/day)					
0 - 33%	0	0	0	0	0.0
34 - 66%	1	1	2	0	1.0
67 - 99%	2	1	5	2	2.5
100%+	97	98	93	98	96.5
Calcium (mg/day)					
0 - 33%	13	9	11	6	9.75
34 - 66%	43	31	22	21	29.25
67 - 99%	27	30	28	17	25.50
100%+	17	30	39	56	35.50
Iron (mg/day)					
0 - 33%	8	4	7	5	6.0
34 - 66%	39	30	43	36	37.0
67 - 99%	33	33	30	30	31.5
100%+	20	33	20	29	25.5
Magnesium (mg/day)					
0 - 33%	5	0	8	0	3.25
34 - 66%	18	17	19	6	15.00
67 - 99%	24	32	36	27	27.75
100%+	53	51	37	67	52.25
Phosphorus(mg/day)					
0 - 33%	4	2	2	0	2.00
34 - 66%	20	13	15	8	14.00
67 - 99%	39	28	23	21	27.75
100%+	37	57	60	71	56.25

Continued

Exhibit 6-6 (continued)

Nutrients	Percent of Pretested Children (Samples A and D) In:				
	Greene & Humphreys Counties n=75	St. Clair County n=94	Maricopa County n=90	Mingo County n=63	All Sites n=322
Vitamin A (IU/day)[a]					
0 - 33%	11	2	8	3	6.00
34 - 66%	13	17	20	13	15.75
67 - 99%	20	24	18	27	22.25
100%+	56	57	54	57	56.00
Thiamin (mg/day)					
0 - 33%	0	0	0	0	0.00
34 - 66%	0	0	1	0	0.25
67 - 99%	7	1	7	0	3.75
100%+	93	99	92	100	96.00
Riboflavin(mg/day)					
0 - 33%	0	0	0	0	0.00
34 - 66%	3	0	0	0	0.75
67 - 99%	5	12	4	6	6.75
100%+	92	88	96	94	92.50
Niacin (mg/day)[b]					
0 - 33%	0	0	0	2	0.5
34 - 66%	3	1	11	9	6.00
67 - 99%	10	17	32	33	23.00
100%+	87	82	57	56	70.5
Vitamin B_6 (mg/day)					
0 - 33%	5	2	10	2	5.00
34 - 66%	15	14	36	19	20.75
67 - 99%	17	28	25	25	23.75
100%+	63	56	29	54	50.05
Vitamin B_{12} (mcg/day)					
0 - 33%	9	0	4	0	3.25
34 - 66%	16	13	13	11	13.25
67 - 99%	24	17	20	11	18.00
100%+	51	70	63	78	65.50
Vitamin C (mg/day)					
0 - 33%	17	6	13	11	47.00
34 - 66%	10	7	18	14	12.25
67 - 99%	6	14	8	10	9.50
100%+	67	73	61	65	66.50

[a] Total Vitamin A value

[b] Milligrams of preformed niacin.

intakes is nonetheless worth noting. It is reasonable to assume that any positive impact from Head Start nutrition services would effect the distribution of percentage of recommended nutrient intakes received in participating groups of children. This hypothesis has been examined in this evaluation; results are discussed in a subsequent section of this chapter focusing on impacts of Head Start nutrition services.

Prevalence of Diets Low in Nutrient Density. Diets of pretested children in all sites were low in nutrient density for calcium, iron and vitamin B_6 as Exhibit 6-7 illustrates. Diets of all children, except those in Greene and Humphreys Counties, were also high in cholesterol density.

The prevalence of diets marginal in nutrient density parallels the prevalence of diets marginal in nutrient intake, in as much as calcium and iron are again the most limiting nutrients. The problem of diets low in iron density is, in fact, not a surprising finding when one considers that the iron density of the average American diet is approximately 6-7 mg per 1000 calories (Williams, Henneman and Fox, 1977; Hegsted, 1982). In order for a child in this age group to achieve the amount of iron required in the RDA standards without exceeding the recommended caloric intake, he or she must consume a diet that supplies approximately 9.6 mg of iron per 1000 calories. Consequently, it is frequently observed that iron nutriture is a major problem for many segments of the population, particularly young children, girls and women between menarche and menopause, and the elderly (Dallman, Stimes and Stekel, 1980; Cook and Finch, 1979). It is quite likely that pretested children who did receive 100 percent of the recommended intake for iron did so because of the large amounts of food they ate, rather than by consuming a higher quality diet, e.g., a diet higher in nutrient density for iron.

Similarly, the fact that diets of children in all sites were low in vitamin B_6 density while mean intakes for this nutrient exceeded 100 percent of the recommended intake in all sites, except Maricopa County, suggests that much of the vitamin B_6 consumed by children was also due to large amounts of food, particularly meat, fish and poultry (recall that the best sources of Vitamin B_6 are animal-source foods), rather than diets superior in nutrient density for vitamin B_6. The concomitant excess in cholesterol density noted in all sites, except Greene and Humphreys Counties, also suggests a pattern of large intakes of meat.

Exhibit 6-7

Unadjusted Mean Nutrient Densities Below RDA Reference Standard for Pretested Children By Site

Nutrient	Pretested Children (Samples A and D) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Protein					
Calcium	+	+	+	+	+
Iron	+	+	+	+	+
Magnesium					
Phosphorus					
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6	+	+	+	+	+
Vitamin B_{12}					
Vitamin C					
Cholesterol		+	+	+	+

+ = group mean below nutrient density standard of RDA reference diet

+ = group mean above recommended intake

Exhibit 6-8 illustrates the percentage of children in each site who consumed diets with nutrient densities below the RDA reference standards. (See Table 6-3 for a more complete description of the data.) Iron density is again the most problematic, with 90 percent of children across all sites consuming diets low in iron density. Vitamin B_6 and calcium densities were also problematic in all sites.

Children in Greene and Humphreys Counties and St. Clair County consumed diets considerably less concentrated in calcium, phosphorous, vitamin A, riboflavin and vitamin B_{12}. Since all of these nutrients are present in concentrated amounts in milk and other dairy products, these findings suggest that children in Greene and Humphreys and St. Clair Counties may consume smaller amounts of milk and other dairy products than children in the other two sites.

Nutrition Services Provided Through Head Start

From its inception in 1965, the Head Start nutrition program has been an ambitious undertaking. In its first printed guidelines, Head Start went on record with explicit goals for the nutrition program that far exceeded those of previous feeding and nutrition programs in either preschools or primary schools. The Head Start nutrition program was built around the following principles (Zigler and Valentine, 1979):

- to build strong bodies, to grow and develop properly, children need the right food;
- a child who is fed when he or she is hungry feels well cared for and secure;
- a well-nourished child has a better chance to learn;
- Head Start can help each child establish good food habits which may help lay the foundation for good health throughout life;
- food and feeding affect many parts of a child's life: the child's body grows stronger and better able to work and play; while the mind learns about new foods, the different ways foods are served, and about making meal time a pleasant experience;

Exhibit 6-8

Prevalence of Diets Low in Nutrient Density[a] for Pretested Head Start Children by Site

	Pretested Children (Samples A and D) In:				
Nutrient	Greene & Humphreys Counties n=75	St. Clair County n=94	Maricopa County n=90	Mingo County n=63	All Sites n=322
Protein					
Number	0	1	0	0	1
Percent	0.00	1.0	0.0	0.0	0.00
Calcium					
Number	60	74	49	34	217
Percent	80.00	79.0	54.0	54.0	67.00
Iron					
Number	66	85	84	56	291
Percent	87.50	91.0	93.0	89.0	90.00
Magnesium					
Number	40	54	46	27	167
Percent	52.75	57.0	51.0	43.0	52.00
Phosphorus					
Number	38	38	23	13	112
Percent	50.50	41.0	26.0	21.0	35.00
Vitamin A					
Number	37	48	30	25	140
Percent	49.00	51.0	33.0	40.0	43.50
Thiamin					
Number	11	24	37	18	90
Percent	14.25	26.0	41.0	29.0	28.00
Riboflavin					
Number	9	15	10	5	39
Percent	12.00	16.0	11.0	8.0	12.00
Niacin					
Number	9	13	40	28	90
Percent	12.00	14.0	44.0	44.0	28.00
Vitamin B_6					
Number	51	69	64	40	224
Percent	68.25	73.0	71.0	63.0	69.50
Vitamin B_{12}					
Number	34	30	17	16	97
Percent	45.00	32.0	19.0	25.0	30.25
Vitamin C					
Number	26	27	36	31	120
Percent	34.25	29.0	40.0	49.0	37.25

[a] Based on RDA-reference diet (see Appendix Note 6-3)

- by involving parents in the nutrition program of the center parents will learn which foods and amounts are best for children. They will also learn that family meals may follow the same pattern as those served at the center; and
- a child who learns to like a variety of foods at the center may influence the kind of foods served at home.

Thus, Head Start's nutrition program seeks to increase the likelihood that participating children will consume a well-balanced and nutritious diet, both now and in the future, through two important activities: provision of nutritious meals and snacks, and education about food and nutrition for both children and parents.

The Head Start performance standards outline five major objectives for the nutrition program. These objectives are designed to:

- provide food which will help meet the child's daily nutritional needs, recognizing individual differences and cultural patterns, and thereby promote sound physical, social, and emotional growth and development;
- provide an environment for nutritional services which will support and promote the use of the feeding situation as an opportunity for learning;
- help staff, child and family to understand the relationship of nutrition to health, factors which influence food practices, a variety of ways to provide for nutritional needs, and to apply this knowledge in the development of sound food habits even after leaving the Head Start program;
- demonstrate the interrelationships of nutrition to other activities of the Head Start program and its contribution to the overall child development goals; and
- involve all staff, parents and other community agencies as appropriate in meeting the child's nutritional needs so that nutritional care provided by Head Start complements and supplements that of the home and community.

(Head Start Program Performance Standards, U.S. Department of Health Education and Welfare, 1975).

Specific performance standards and guidelines designed to assist Head Start programs in meeting these objectives are listed below. The list is not all-inclusive because in some cases, sufficient data on program operations were not collected to allow evaluation of program compliance with particular stated objectives. The Head Start Health Evaluation focused on services provided to participating children and their families rather than on more global program philosophies and educational goals. The standards for Head Start nutrition services evaluated in this report include:

- identify nutritional needs and problems of Head Start children and their families, using:
  - nutrition assessment data (height, weight, hemoglobin/hematocrit);
  - information about family eating habits, special dietary needs and feeding problems;
  - information about major community nutrition problems;
- assist in meeting nutritional needs of the children by ensuring that:
  - every child in a part-day program will receive a quantity of food in meals (preferably hot) and snacks which will provide at least one-third of daily nutritional needs;
  - every child in a full-day program will receive snack(s), lunch, and other meals as appropriate which will provide one-half to two-thirds of daily nutritional needs, depending on the length of the program;
  - all children in morning programs who have not received breakfast at the time they arrive at the Head Start program will be served a nourishing breakfast;
  - the kinds of food served will conform to the minimum standard meal patterns (see Exhibit 6-11, below);
  - the quantities of food served will conform to recommended amounts (see Exhibit 6-11, below);
- set forth an organized nutrition education program for staff, parents and children which shall ensure that:
  - families receive education in the selection and preparation of foods to meet family needs, guidance in home and money management, and help in consumer education so that they can fulfill their major role and responsibility for the nutritional health of the family.

(Head Start Program Performance Standards, U.S. Department of Health Education and Welfare, 1975).

These performance standards cover three main types of nutrition and nutrition-related services:

- identification of children or families with specific nutritional problems and in need of special intervention;
- provision of meals and snacks to Head Start children; and
- provision of nutrition education to Head Start parents.

Identification of Nutritional Needs. The nutrition assessment, as defined in the performance standards, screens for children who are anemic (based on hemoglobin or hematocrit levels), underweight, or overweight (based on accepted growth standards). Inasmuch as hematologic and anthropometric status have been the subjects of separate analyses in the Head Start Health Evaluation, the provision of these screens has been discussed in the appropriate chapters (Chapter Seven--Biochemical Evaluation, Chapter Five--Anthropometric Evaluation).

Interviews with program staff revealed that in most sites the remainder of the nutritional needs information (data on family eating habits, special needs, etc.) were collected by program staff or Head Start center staff at the time of enrollment. Systems for identification and follow-up of individual children or families with nutrition problems were found to be vaguely defined and varied greatly from site to site. For the most part, children with suspected nutrition problems were identified by teachers, social service aides, or other center staff. Only Maricopa County had a full-time nutrition consultant available for handling such referrals. In other sites, referrals were made to physicians, WIC clinics or other available local nutrition counseling services. Records of such transactions were not routinely kept in the child's health records; it was therefore not possible to assess the extent to which such referrals were made. It seems apparent, though, through informal observations and interviews with program staff, that actual assessment or follow-up on any food habit or food intake data collected during the enrollment interview was infrequent in all sites, with the possible exception of Maricopa County, where the services of a full-time nutrition consultant were available.

Identification of families who were eligible for, but were not receiving, federal food assistance benefits (Food Stamps or WIC) was reported to be a high priority in the assessment of nutritional needs of the family in all sites. According to Head Start staff, a concerted effort was made to assist such families in acquiring appropriate food assistance benefits. A subsequent section in this chapter will discuss analyses that addressed the question of whether Head Start participation had a positive effect on families' receipt of food assistance benefits.

Provision of Meals and Snacks to Head Start Children. With the exeption of the Head Start program in Greene and Humphreys Counties, all programs included in this evaluation were part-day programs which serve children from 3 to 6 hours each day.* As such, they are required to serve children one main meal (lunch or breakfast) and one snack, which should theoretically supply 33 percent of the child's daily nutrient needs.** The full-day program in Greene and Humphreys Counties is required to serve lunch or supper, plus breakfast or two well-planned snacks, with the aim of supplying one-half to two-thirds of the child's daily nutrient needs (see Exhibit 6-9).

The number and types of meals served in all programs were in compliance with the USDA Child Care Food Program (CCFP) guidelines (see Exhibit 6-10). CCFP provides funds for provision of meals and snacks to children in eligible day-care settings. A study of the Child Care Food Program conducted by Abt Associates found that child care centers participating in the CCFP were more likely to serve breakfast than those not participating in the program (Fox and Glantz, 1981). Virtually 100 percent of all center-based Head Start programs (excludes home-based Head Start programs) participate in the Child Care Food Program.***

Meal component guidelines and quantity requirements for the CCFP are listed in Exhibit 6-11.

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*Verbal communication--Margaret Phillips, Head Start Program Nutritionist, U. S. Department of Health and Human Services, July 1982.

**The age-appropriate average RDA values are the guidelines generally used. (Head Start Performance Standards, U. S. Department of Health, Education and Welfare, 1975).

***Verbal communication--Margaret Phillips, Head Start Program Nutritionist, U. S. Department of Health and Human Services, July 1982.

Exhibit 6-9

Head Start Performance Standards for Meal Service In Full- and Part-Day Programs

Head Start Performance Standard	Type of Program	
	Full-Day	Part-Day
Hours of operation	More than 6 hours per day	3 to 6 hours per day
Meals to be served	(A) Lunch or Supper plus (B) Breakfast or 2 snacks	(A) Lunch or Breakfast plus (B) 1 snack
Proportion of child's daily nutrient needs to be supplied	50% - 66%	33%

Meals and snacks served in Head Start centers during the process of data collection were evaluated for their compliance with these meal component guidelines; data are summarized in Exhibit 6-12. (No formal assessment of compliance with quantity requirements was carried out in this evaluation.) In general, meals observed in the Head Start centers were in compliance with CCFP and/or Head Start meal component guidelines. There was some evidence that the different guidelines for snacks may be confusing to program personnel, since any snack found to be noncompliant with CCFP regulations was at the same time found to be in compliance with the less demanding meal component requirements outlined in the Head Start performance standards. The performance standards encourage programs to comply with USDA guidelines, but the inconsistency between Head Start and USDA recommendations may act to encourage programs in the opposite direction, since the Head Start guidelines

Exhibit 6-10

Head Start Nutrition Program Characteristics by Site

Program Characteristics	Greene & Humphreys Counties	St. Clair County	Maricopa[a] County	Mingo County
Type of Program	Full-Day	Part-Day	Part-Day	Part-Day
Hours of Operation	7:30 - 2:00	9:00 - 2:00	(1) 8:00 - 11:45 (2) 9:00 - 1:00 (3) 12:00 - 3:45 (4) 11:00 - 3:00	8:30 - 2:30
Total Hours Per Day	6 1/2	5	Approx. 4	6
Meals Served	Breakfast Lunch Afternoon Snack	Breakfast Lunch Afternoon Snack	(1) Breakfast and Lunch (2) Morning Snack and Lunch (3) Lunch and Afternoon Snack (4) Lunch and Afternoon Snack	Breakfast Lunch Afternoon Snack
Type of Meal Service	Family Style	Family Style	45% Family Style[b] 55% Cafeteria Style	Family Style
Food Service System	Centralized cycle menu; food prepared in each center's kitchen	Centralized cycle menu; food purchased from vendor and delivered to each center	No centralized menu: center either receives food from school kitchen or children eat in school cafeteria	Centralized cycle menu; food prepared in each center's kitchen

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[a] All programs in Maricopa County are part-day programs, but hours of operation and associated meal patterns varied from center to center. All centers followed one of the four configurations identified above.

[b] Most Head Start centers in Maricopa County were located in elementary schools. Some programs received food from the cafeteria and served it to children in the Head Start classrooms. In other centers, children went to the school cafeteria for lunch or breakfast. (Snacks were usually served in the classroom in all centers.)

Exhibit 6-11

Child Care Food Program
Requirements for Meals and Snacks Served in Head Start Centers

CCFP Requirements[a]	
Breakfast	
Milk	3/4 cup
Cereal	1/3 cup
or	
Bread	1/2 slice
Juice or Fruit	1/2 cup
Snack	
At least 2 of the following, including:	
Milk	1/2 cup
Fruit/Juice/ Vegetable	1/2 cup
plus	
Bread	1/2 slice
or	
Cereal	1/3 cup
Lunch	
Milk	3/4 cup
Protein-rich food[b]	1 1/2 oz (or equiv)
Vegetables and/or fruit	1/2 cup (at least 2 kinds)
Bread	1/2 slice

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[a] U. S. Department of Agriculture, "A Planning Guide For Food Service in Child Care Centers", 1976.

[b] Meat, fish, poultry, eggs, cheese or legumes.

Exhibit 6-12

Compliance with Meal Component Requirements in Meals and Snacks Observed in Head Start Centers by Site

	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
	n=9	n=8	n=9	n=8	n=34
Breakfast					
• number observed	9	8	5	8	30
• percent compliant	100	100	80	87.5	94.1
• reasons for non-compliance	—	—	no milk served	no milk served	—
Morning Snack					
• number observed	NA	NA	3	NA	3
• percent compliant			100		100
• reasons for non-compliance			—		—
Lunch					
• number observed	9	8	9	8	34
• percent compliant	66	62.5	78	100	76.5
• reasons for non-compliance	only one vegetable/ fruit served	only one vegetable served (n=2) no milk served (n=1)	only one vegetable served (n=1) no milk served (n=1)	—	—
Afternoon Snack					
• number observed	9	8	3	8	28
• percent compliant	89	50	100	87.5	78.6
• reasons for non-compliance	no bread or bread substitute served[a]	no bread or bread substitute served[a]	—	no bread or bread substitute served[a]	—

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[a] Snacks as served were not compliant with USDA Child Care Food Program regulations, but were in compliance with Head Start performance standards (see Exhibit 6-11). Head Start performance standards require only one food group for snacks, whereas CCFP regulations require two, one of which must be bread or an acceptable bread substitute.

encourage programs in the opposite direction, since the Head Start guidelines are less stringent. Other than this confusion about appropriate meal components for snacks, the only problems detected involved two centers where milk was not served with the breakfast meal, two centers where milk was not served with lunch, and six centers where only one vegetable or fruit selection was offered at lunch.

These deviations from program guidelines, although certainly important to note, did little to affect the average nutrient contribution of the total Head Start meal service in each site. The mean nutrient contribution from Head Start meals in all sites successfully met the performance standard goals* for calories and all nutrients, with only two exceptions: the mean iron intake of children in Greene and Humphreys Counties provided only 43 percent of the recommended intake and the mean vitamin B_6 intake in Maricopa County provided approximately 29 percent of the recommendation (see Table 6-4). These shortcomings are not surprising, given the previous discussions on the problems associated with iron consumption in this population group, and the pattern of vitamin B_6 intake in the Maricopa County site. Across all sites, Head Start programs (including part-day programs) provided over 50 percent of the recommended amount of all nutrients with the exceptions of iron (42%), niacin (47%) and vitamin B_6 (47%) (see Table 6-5).

Head Start programs are successfully meeting their goals in providing significant proportions of children's daily nutrient needs. In addition, as Exhibit 6-13 indicates, programs are making substantial contributions to children's total daily nutrient intake. In general, Head Start programs are providing 40 to 50 percent of the total amount of nutrients children receive each day (see Tables 6-6 and 6-7). It is interesting to note that the mean percentage of total daily intake provided by Head Start meals and snacks in Greene and Humphreys Counties is consistently higher than that in the other three sites for almost every nutrient. The differences between Greene and Humphreys Counties and St. Clair and Mingo Counties are of particular interest, since the Head Start meal service programs in each of these sites

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*33 percent of children's daily nutrient needs for the part-day programs in St. Clair County, Maricopa County and Mingo County; 50 to 66 percent for the full-day programs in Greene and Humphreys Counties.

Exhibit 6-13

Mean Percent of Total Daily Intake Provided by Meals and Snacks Served in Head Start Centers by Site[a]

	Greene & Humphreys Counties n=110	St. Clair County n=72	Maricopa County n=58	Mingo County n=72	All Sites n=312
Calories	47.1	38.8	39.6	44.6	43.2
Protein (gm)	51.8	40.2	42.6	45.4	45.9
Fat (gm)	50.1	37.3	45.6	44.4	45.0
Carbohydrate (gm)	44.6	39.6	34.1	44.6	41.5
Calcium (mg)	66.7	46.7	49.2	56.7	56.6
Iron (mg)	47.9	39.2	37.5	41.9	42.6
Magnesium (mg)	54.3	45.4	42.3	49.2	48.9
Phosphorus (mg)	58.4	43.1	43.5	48.8	49.9
Vitamin A (I.U.)[b]	64.0	50.0	42.0	48.0	53.0
Thiamin (mg)	47.5	36.2	40.1	47.6	43.5
Riboflavin (mg)	61.8	43.3	44.4	51.1	51.7
Niacin (mg)[c]	43.4	34.8	34.5	37.3	38.3
Vitamin B_6 (mg)	47.8	37.8	36.1	43.5	42.3
Vitamin B_{12} (mcg)	64.0	43.3	45.3	50.8	52.3
Vitamin C (mg)	45.2	44.9	39.2	46.3	44.2
Cholesterol (mg)	59.2	45.2	46.0	42.9	49.6

[a] Detailed data are presented in Appendix Tables 6A-5 and 6A-7.

[b] Total Vitamin A value.

[c] Milligrams of preformed niacin.

is identical (e.g., breakfast, lunch, afternoon snack). As the data in Tables 6-6 and 6-7 illustrate, differences between Greene and Humphreys Counties and St. Clair County stem largely from an increased nutrient content of meals and snacks provided by the Head Start program in Greene and Humphreys Counties. Differences noted for Mingo County, however (differences were not as large or as consistent as differences for St. Clair County), are apparently due to lower overall intakes of children in Greene and Humphreys Counties. That is, children in Greene and Humphreys Counties consumes less food at home that did children in Mingo County; the overall influence of Head Start meals and snacks on children's total nutrient intake was therefore greater in Greene and Humphreys Counties.

A similar trend is apparent in Maricopa County. As Exhibit 6-13 indicates, the proportion of total daily intake provided by Head Start meals and snacks in Maricopa County is often similar to or greater than that provided in St. Clair and Mingo Counties, even though the total nutrient content of Head Start meals and snacks provided by the Maricopa County program was often substantially lower than the other two sites, since Maricopa County Head Start serves only one meal and one snack to participating children (see Exhibit 6-10 and Table 6-4).

These findings suggest that the relative importance of Head Start meals to each child's total daily intake varied from site to site and depended upon the amount of food that the child received at home. It is worth noting that a program serving children less than four hours per day (Maricopa County) can have the same relative impact on total daily intake as programs serving children five or six house per day (Greene and Humphreys, St. Clair and Mingo Counties).

In summary, both the Head Start program philosophy and nutrition performance standards currently work hand-in-hand with the Child Care Food Program in providing Head Start children with well-balanced and nutritious meals and snacks. Meals and snacks provided by Head Start successfully provided the mandated proportions of children's daily nutrient needs, in all but a few instances. Head Start meals and snacks generally provided 40-50 percent of children's total daily intake, and thus had a significant and important impact on their overall diets. The magnitude of this impact varied from site to site and was greatest in those sites where parents appear to serve less food to their children at home (Greene and Humphreys and Maricopa Counties).

Provision of Nutrition Education to Head Start Parents. The Head Start Performance Standards suggest both formal and informal approaches to the provision of nutrition education. Formal parent education classes are suggested, as well as informal discussions between parents and teaching staff, involvement of parents in food service and menu-planning or other nutrition-related activities. Sufficient data on program operations were not collected to allow assessment of educational opportunities on all of these levels. Data were collected, however, on mothers' (or other caregivers') involvement in parent education meetings, and parents' visits to or involvement in classroom activities. These data are summarized in the next two exhibits. Exhibit 6 -14 summarizes parent participation in classroom activities and attendance at parent meetings; Exhibit 6-15 presents data on the frequency of parent participation in each of these activities.

Parent involvement in Head Start classrooms or parent meetings was fairly consistent across sites, although it was slightly higher in Maricopa County. Across all sites, 85 percent of the parents had visited their child's classroom at least once. As illustrated in Exhibit 6-15, the majority of parents who visited Head Start classrooms did so less than once a month (36%). In general, parents were more likely to visit their children's classrooms than to attend parent meetings. Seventy percent of the parents reported attendance at one or more parent meetings in the preceding six-month period. Of the group that participated in parent meetings, the most frequently reported attendance (33%) was two or three meetings during the preceding six months.

Of the parents who participated in any parent meetings, about one in three attended sessions on food and nutrition; about one-fourth participated in sessions on available community health services. In St. Clair County, attendance at such sessions was considerably higher than in the other three sites. Parent meetings addressed a wide array of topics, including general child behavior (discipline, bedwetting, etc.), general child development (how children learn and grow), and others not related to health and/or nutrition.

These data indicate that formal opportunities for parent education about food and/or nutrition, as assessed in this evaluation, were generally limited to a small proportion of the parents in each site. Informal opportunities, on the other hand, such as those which might arise during visits to

Exhibit 6-14

Parents' Involvement in Head Start Classrooms or Participation in Parent Education Meetings by Site

	Parents of Posttested Head Start Children (Samples A, B and C) In:				
	Greene & Humphreys Counties n=118	St. Clair County n=102	Maricopa County n=106	Mingo County n=113	All Sites n=439
Parents reporting involvement in or visit to Head Start classroom					
Number	89	84	100	101	374
Percent	75.4	82.4	94.3	89.4	85.2
Parents reporting[a] attendance at one or more parent meetings					
Number	81	67	87	73	308
Percent	68.6	65.7	82.1	64.6	70.2
Parents reporting[b] attendance at meetings focusing on food/nutrition					
Number	21	31	24	19	95
Percent	25.9	46.3	27.6	26.0	30.8
Parents reporting[b] attendance at meeting focusing on available community services					
Number	21	28	17	11	77
Percent	25.9	41.8	19.5	15.1	25.0

[a] Reported attendance covers six-month time period immediately preceding health assessments (November, 1980 to April, 1981).

[b] As percentage of parents who reported attending at least one meeting in the preceding six-month period.

Exhibit 6-15

Frequency of Parents' Involvement in Head Start Classroom Activities or Participation in Parent Education Meetings By Site

	Parents of Head Start Children (Samples A, B and C) In:				
	Greene & Humphreys Counties n=118	St. Clair County n=102	Maricopa County n=106	Mingo County n=113	All Sites n=439
Frequency of involvement in or visit to Head Start classrooms Number[a]	(87)	(82)	(100)	(100)	(369)
• less than once a month					
Number	39	17	34	43	133
Percent	44.8	20.7	34.0	43.0	36.0
• once a month					
Number	26	16	21	26	89
Percent	29.9	19.5	21.0	26.0	24.1
• once a week					
Number	11	31	31	28	101
Percent	12.6	37.8	31.0	28.0	27.4
• every day					
Number	11	18	14	3	46
Percent	12.6	22.0	14.0	3.0	12.5
Number of parent meetings attended in past six months Number	(77)	(63)	(78)	(50)	(258)
• only one					
Number	9	7	12	10	38
Percent	11.7	11.1	15.4	20.0	14.7
• 2-3 meetings					
Number	25	18	21	20	84
Percent	32.5	28.6	26.9	40.0	32.6
• 4-5 meetings					
Number	19	13	15	8	55
Percent	24.7	20.6	18.8	16.0	20.4
• 6-7 meetings					
Number	10	13	6	3	32
Percent	13.0	20.6	7.5	6.0	11.8
• 8 or more meetings					
Number	14	12	24	9	61
Percent	18.2	19.0	32.5	7.6	22.6

[a] Base numbers and percentages reported here may not match data in Exhibit 6-29 due to missing data on frequency of participation in some cases.

Head Start centers or children's classrooms, were apparently available to larger numbers of parents. In a later section of this chapter, we assess whether these formal and informal opportunities for nutrition education had an impact on parents' feeding behaviors, and consequently on either the nutrient content or nutritional quality of the diets provided to Head Start children at home.

Nutrition Services Provided Through Other Sources

There are few sources other than Head Start that provide comparable nutrition services for preschool children. The one service that approximates Head Start most closely in terns of nutrtion services is center-based day care, where meals and snacks are provided to enrolled children. Enrollment in day case was generally low (13%) but showed considerable variability across the four sites. Enrollment in day car for both Head Start and non-Head Start children was highest in Maricopa County, where one out of four children were enrolled in day care. In contrast, none of the children in Mingo County were enrolled in a day care center. (Use of day care services was similar in Head Start and non-Head Start groups, although it tended to be slightly, but not significantly, higher for the group of children not enrolled in Head Start.)*

Other nutrition services available in the community include federal food assistance programs, e.g., Food Stamps and the Supplemental Food Program for Women, Infants and Children (WIC). We investigated whether families' participation in these food assistance programs made a difference in children's nutrient intake or the overall nutritional quality of their diets. Results of these analyses are discussed in a subsequent section of this chapter.

Impacts of Head Start Nutrition Services

The impacts of Head Start nutrition services were evaluated for both the longitudinal sample (Sample A) and the total cross-sectional sample (Samples A, B and C), both within and across sites. In addition to impact on nutrient intake and overall nutrtional quality of the diet, Head Start impacts on families' patterns of participation in federal food assistance programs was evaluated. The impact of parent involvement in Head Start classroom activities and participation in parent education meetings focusing on food and nutrition was also examined in the cross-sectional sample. Results of these analyses are discussed in the following pages.

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*Because utilization of day care services was low and similar for both Head Start and non-Head Start groups, we did not attempt to identify or compare impacts from day care services.

Longitudinal Analyses

Impacts on Mean Nutrient Intake and Percent of Recommended Daily Intake Recieved. Multiple regression analyses of nutrient intake for all children in the longitudial sample revealed that nutrient intake at pretest was a significant predictor of nutrient intake at posttest for almost all nutrients (see Tables 6-8 and 6-9). These results suggest that on average, for most children, there was little significant change in total nutrient intake from pretest to posttest. Significantly, however, and across all sites the Head Start-present group experienced significant changes in the intake of calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12}, as Exhibit 6-16 illustrates. These significant changes in the total nutrient intake were not observed among the group of Head Start who were absent from the program or the non-Head Start children whose daily intakes remained very similar to the more marginal intakes observed at pretest. Hence, across all sites, mean intake of these nutrients in the Head Start-present group provided 100 percent or more of the daily recommendations, and was significantly greater than the mean intakes for either the Head Start-absent or non-Head Start groups. Presence and significance of differences varied across sites. Differences were largest and most frequent in Greene and Humphreys Counties, where children had some of the lowest intakes at pretest. The fewest differences were noted in Maricopa County, perhaps due to the more limited scope of the Head Start meal service.

Impact on Distribution of Percent of Nutrient Intake Standard Recieved. The increased intake of calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12} also produced significant differences in the percentage of children in the Head Start-present group who consumed 100 percent of the daily recommendations for each of these nutrients, with the

Exhibit 6-16

Pattern of Differences in Mean Nutrient Intake at Posttest for Longitudinal Head Start and Non-Head Start Children within and across Sites

Nutrient	Longitudinal Head Start and Non-Head Start Children (Sample A) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Protein	HS-P > HS-A^{a}				
Calcium	HS-P > NHS^{c} HS-P > HS-A^{c}		HS-P > HS-A^{a}	HS-P > NHS^{a} HS-P > HS-A^{a}	HS-P > NHS^{c} HS-P > HS-A^{c}
Magnesium	HS-P > NHS^{a} HS-P > HS-A^{c}	HS-P > NHS^{a} HS-P > HS-A^{a}	HS-P > HS-A^{a}		HS-P > NHS^{c} HS-P > HS-A^{c}
Phosphorus	HS-P > NHS^{a} HS-P > HS-A^{b}		HS-P > HS-A^{a}		HS-P > NHS^{b} HS-P > HS-A^{c}
Vitamin A	HS-P > NHS^{c} HS-P > HS-A^{a}	HS-P > NHS^{a} HS-P > HS-A^{a}		HS-P > NHS^{a}	HS-P > NHS^{c} HS-P > HS-A^{c}
Riboflavin	HS-P > NHS^{a}				HS-P > NHS^{b} HS-P > HS-A^{c}
Vitamin B_{12}	HS-P > NHS^{b} HS-P > HS-A^{b}				HS-P > NHS^{c} HS-P > HS-A^{a}

HS-P = Head Start-present group
HS-A = Head Start-absent group
HNS = Non-Head Start

Significance Levels:

$^{a}p \leq 0.05$
$^{b}p \leq 0.01$
$^{c}p \leq 0.001$

exception of riboflavin.* Of the children who consumed less than 100 percent of the recommended amounts of calcium, magnesium, phosphorus, vitamin A and vitamin B_{12} at pretest, significantly greater numbers of children in the Head Start-present group showed improvement at posttest, as shown in Exhibit 6-17. The most substantial differences were noted for calcium, and phosphorus, where 58 percent and 75 percent, respectively, of the Head Start-present group who were below 100 percent of the nutrient intake standards at pretest improved to 100 percent or more of the standards at posttest. Comparable changes occurred for only 19 percent (calcium) and 26 percent (phosphorus) of the Head Start-absent group, and 26 percent (calcium) and 50 percent (phosphorus) of the non-Head Start group.

These findings indicate that change in nutrient intake from pretest to posttest was minimal, and not statistically signiticant, for children who did not receive meals and snacks through the Head Start nutrition program. For the group of children who did receive Head Start meals and snacks, there was evidence of significant and beneficial increases in intake of six key nutrients: calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12}.

Impact on Nutrient Density. Results of nutrient density analyses (see Tables 6-10 and 6-11) add important insight into possible causes for the improvements in nutrient intake reported in the preceding section. As indicated in Exhibit 6-18, pretest to posttest change in nutrient density paralleled the changes in total nutrient intake. Across all sites, children in the Head Start-present group consumed diets superior in nutrient density for five of the six key nutrients: calcium, magnesium, phosphorus, vitamin A and vitamin B_{12}. These findings indicate that the increased intake of these nutrients noted in the Head Start-present group were not simply the result of consumption of additional amounts of food, but were also related to consumption of foods particuarly concentrated in these nutrients. That is, children in the Head Start-present group apparently consumed significantly greater amounts of particular foods that were high in nutrient density for calcium, magnesium, phosphorus, vitamin A and vitamin B_{12} than did children in the Head Start-absent and non-Head Start groups. All of these nutrients occur in significant amounts in milk and other dairy products. The evidence

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*As Exhibit 6-6 illustrated, fewer than 10 percent of all children in each site (except St. Clair County) consumed less than 100 percent of the recommended amount of riboflavin at pretest.

Exhibit 6-17

Improvement in Percent of Recommended Daily Intake Received from Pretest to Posttest for Head Start-Present, Head Start-Absent and Non-Head Start Children across Sites

Nutrient	Percent of Longitudinal Head Start and Non-Head Start (Sample A) Children In:		
	Head Start-Present Group (n=76)	Head Start-Absent Group (n=36)	Non-Head Start Group (n=69)
Calcium			
Below 100% at pretest (n)	46	31	50
Improved at posttest (n)	27	6	13
(%)	58.7	19.4	26.0
Magnesium			
Below 100% at pretest (n)	38	21	38
Improved at posttest (n)	19	4	17
(%)	50.0	19.0	44.7
Phosphorus			
Below 100% at pretest (n)	36	19	42
Improved at posttest (n)	27	5	21
(%)	75.0	26.3	50.0
Vitamin A			
Below 100% at pretest (n)	34	14	33
Improved at posttest (n)	24	7	11
(%)	70.6	50.0	33.3
Vitamin B_{12}			
Below 100% at pretest (n)	29	14	30
Improved at posttest (n)	25	5	17
(%)	86.2	35.7	56.7

seems to suggest that the provision of milk, as mandated in the CCFP and Head Start meal component regulations (see Exhibit 6-11) may play a large part in the improvements in nutrient intake and overall nutrient density of the diet reported here. This hypothesis is in keeping with the observation made by Fox and Glantz (1981) in their evaluation of the Child Care Food Program, in which day care centers participating in the CCFP were found to serve significantly more milk than day care centers not participating in the CCFP. Differences in the nutrient content of diets served in CCFP day care centers were similar to those reported here, i.e., differences were greatest for calcium, magnesium, phosphorus and riboflavin.

Impact on Patterns of Participation in Federal Food Assistance Programs. Changes in participation in federal food assistance programs from pretest to posttest were examed for Head Start and non-Head Start families to determine whether Head Start had a positive influence on families' enrollment in such programs.* As Exhibit 6-19 illustrates, there were no significant differences in the patterns of program participation between the Head Start and non-Head Start groups at pretest. There were, however, differences across sites; the proportion of families receiving no food assistance benefits was substantially larger in Maricopa and Mingo Counties.

Overall, Head Start families experienced more positive change** from pretest to posttest than did non-Head Start families (see Exhibit 6-20). That is, across all sites, 39 percent of the Head Start households experienced an increased or improved pattern of participation in food assistance programs versus 29 percent of the non-Head Start households. The most notable differences between Head Start and non-Head Start groups in pretest-to-posttest change occurred in Maricopa County and Mingo County for the families who were receiving no food assistance benefits at pretest. In Maricopa County, half of the Head Start families receiving no food assistance at pretest were participating in one or more programs at posttest, while a similar change occurred in less than a third of the non-Head Start families.

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* Data on participation in food assistance programs were actually collected on children's households, since many children lived in large extended-family households. The term "family," as used here, actually refers to the entire household. Both terms are used interchangeably throughout this report.

**Households were considered to have an improved participation pattern if they were participating in a new food assistance program at posttest, even if the total number of food assistance programs the household participated in remained the same.

Exhibit 6-18

Pattern of Differences in Nutrient Density at Posttest for Longitudinal Head Start and Non-Head Start Children within and across Sites

Nutrient	Longitudinal Head Start and Non-Head Start Children (Sample A) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Calcium	HS-P > NHS^{c} HS-P > HS-A^{c}			HS-P > NHS^{a} HS-P > HS-A^{a}	HS-P > NHS^{c} HS-P > HS-A^{c}
Magnesium	HS-P > NHS^{c} HS-P > HS-A^{a}	HS-P > NHS^{c} HS-P > HS-A^{b}	HS-P > NHS^{b} HS-P > HS-A^{a}		HS-P > NHS^{c} HS-P > HS-A^{c}
Phosphorus	HS-P > NHS^{c} HS-P > HS-A^{b}	HS-P > NHS^{a} HS-P > HS-A^{a}	HS-P > NHS^{a} HS-P > HS-A^{a}		HS-P > NHS^{c} HS-P > HS-A^{c}
Vitamin A	HS-P > NHS^{c}	HS-P > NHS^{b} HS-P > HS-A^{a}		HS-P > NHS^{b} HS-P > HS-A^{a}	HS-P > NHS^{c} HS-P > HS-A^{a}
Riboflavin		HS-P > HS-A^{a}	HS-P > NHS^{a}	HS-P > HS-A^{b}	
Vitamin B_{12}		HS-P < NHS^{d}			HS-P > NHS^{a}
Vitamin C	HS-P < NHS^{d}	HS-P > NHS^{a}			

HS-P = Head Start-present group
HS-A = Head Start-absent group
HNS = Non-Head Start

Significance Levels:

$^{a}p \leq 0.05$

$^{b}p \leq 0.01$

$^{c}p \leq 0.001$

^{d}Effect in opposite direction; $p \leq 0.05$

Exhibit 6-19

Pattern of Participation in Federal Food Assistance Programs at Pretest for Longitudinal Head Start and Non-Head Start Families by Site

Pattern of Food Assistance Program Participation		Longitudinal Families (Sample A) In:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=42	NHS n=31	HS n=24	NHS n=17	HS n=40	NHS n=16	HS n=18	NHS n=18	HS n=124	NHS n=82
Food Stamps Only	n	6	8	4	5	13	5	2	4	25	22
	%	14.3	25.8	16.7	29.4	32.5	31.3	11.1	22.2	20.2	26.8
WIC Only	n	8	5	4	2	4	2	0	2	16	11
	%	19.0	16.1	16.7	11.8	10.0	12.5	0.0	11.1	12.9	13.4
Food Stamps and WIC	n	17	16	14	7	9	2	6	6	46	31
	%	40.5	51.6	58.3	41.2	22.5	12.5	33.3	33.3	37.1	37.8
No Food Assistance	n	11	2	2	3	14	7	10	6	37	18
	%	26.2	6.5	8.3	17.6	35.0	43.8	55.6	33.3	29.8	22.0

Exhibit 6-20

Change in Food Assistance Program Participation Pattern for Longitudinal Head Start and non-Head Start Families Across and Within Sites[a]

		Longitudinal Families (Sample A) In									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=42	NHS n=31	HS n=24	NHS n=17	HS n=40	NHS n=16	HS n=18	NHS n=18	HS n=124	NHS n=82
Families Receiving Either Food Stamps or WIC at Pretest[b]	n %	14 33.3	13 41.9	8 33.4	7 41.2	17 42.5	7 43.8	2 11.1	6 33.3	41 33.1	33 40.2
Families With Improved Food Assistance Pattern at Posttest	n %[c]	3 21.4	6 46.0	2 25.0	1 14.3	3 17.6	1 14.2	1 50.0	1 16.7	9 22.0	9 27.0
Families Receiving No Food Assistance at Pretest	n %	11 26.2	2 6.5	2 8.3	3 17.6	14 35.0	7 43.8	10 55.6	6 33.3	37 29.8	18 22.0
Families Receiving New Food Assistance at Posttest	n %[d]	7 63.6	1 50.0	2 100.0	3 100.0	7 50.0	2 28.5	5 50.0	0 0.0	21 56.8	6 33.3
Total Families With Some Positive Change in Food Assistance Pattern	n %[e]	10/25 40.0	7/15 46.7	4/10 40.0	4/10 40.0	10/31 32.3	3/14 21.4	6/12 50.0[f]	1/12 8.3	30/78 38.5	15/51 29.4

Differences between groups were either not significant or sample sizes were too small to demonstrate significance, unless otherwise noted.

Families receiving both WIC and Food Stamp benefits at pretest were excluded from these analyses because there was no likely improvement in participation pattern, given the participation parameters examined here.

As percent of families who were receiving either Food Stamps or WIC benefits.

As percent of families who were receiving no food assistance at pretest.

As percent of total eligible sample (c and d, above).

Significance of Chi-Squared Test for independence (1 df):

x^2 = 4.68; p = 0.03

In Mingo County, a positive change occurred for five of the ten Head Start families receiving no food assistance benefits at pretest, however, none of the six comparable non-Head Start families had changed their participation pattern by posttest.

Although the numbers available for analysis are too small to demonstrate significance, and therefore limit the conclusions one can draw, the fact that the families in the longitudinal sample were from the original random assignment groups and were similar in income and other background characteristics suggests that the group differences are due to Head Start intervention, at least in some sites. Head Start may indeed play an important role in identifying families in need of the services available from federal food assistance programs and serve as an effective link between these programs and needy families.

Cross-Sectional Analyses

Impact on Mean Nutrient Intake and Percent of Recommended Daily Intake Received. Exhibits 6-21 through 6-23 illustrate the pattern of marginal nutrient intakes noted for each of the three treatment groups (Head Start-present, Head Start-absent, and non-Head Start) in the total cross-sectional sample (Samples A, B and C).* As these exhibits clearly indicate, the problems of marginal calcium and iron intakes noted at pretest persisted in the Head Start-absent and non-Head Start groups, but were much improved in the Head Start-present group. The mean intake of calcium for the Head Start-present group in all sites exceeded 100 percent of the standard; mean intakes of iron also met the recommendation in all sites except Greene and Humphreys Counties and Maricopa County, where mean intakes supplied approximately 94 percent of the recommended amount.** Similarly, the problem of marginal caloric intake continued only for the Head Start-absent group in Maricopa County.

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*Appendix Tables 6-12 through 6-23 contain detailed breakdowns of the nutrient intake data and proportions of nutrient intake standard received for all three treatment groups, both within and across sites. Appendix Tables 6-36 through 6-52 provide additional detailed breakdowns of nutrient intake data by age and sex.

**This finding must be considered in light of the children's age increase from pretest to posttest and the concomitant 33 percent decrease in the recommended iron intake (see Appendix Note 6-3). Nonetheless, absolute intakes of iron at posttest were greater than those at pretest--the most substantial increase was noted for the Head Start-present group (see Appendix Tables 6-12 through 6-23.

Exhibit 6-21

Unadjusted Mean Nutrient Intakes Below 100 Percent of Recommended Daily Intake for Posttested Head Start Children Present in Head Start on Day of Recall by Site

Nutrient	Posttested Head Start-Present Children (Samples A, B, and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Calories					
Protein					
Calcium					
Iron	+		+		
Magnesium			+		
Phosphorus					
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6			++		
Vitamin B_{12}					
Vitamin C					

+ 90-99% of recommended intake
++ 80-89% of recommended intake
+++ 70-79% of recommended intake
++++ Below 70% of recommended intake

Exhibit 6-22

Unadjusted Mean Nutrient Intakes Below 100 Percent of Recommended Daily Intake for Posttested Head Start Children Absent from Head Start on Day of Recall By Site

Nutrient	Posttested Head Start-Absent Children (Samples A, B, and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Calories			++		
Protein					
Calcium	++++	+	+++	+	++
Iron			+	++	+
Magnesium	++		+++	+	+
Phosphorus	+				
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6			++	+	
Vitamin B_{12}	+				
Vitamin C					

+ 90-99% of recommended intake
++ 80-89% of recommended intake
+++ 70-79% of recommended intake
++++ Below 70% of recommended intake

Exhibit 6-23

Unadjusted Mean Nutrient Intakes Below 100 Percent of Recommended Daily Intake for Posttested Non-Head Start Children by Site

Nutrient	Posttested Non-Head Start Children (Samples A, B, and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Kilocalories					
Protein					
Calcium	+++	++	+	+	++
Iron	+	+	+	+++	+
Magnesium			++		
Phosphorus					
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6			++		
Vitamin B_{12}					
Vitamin C					

+ 90-99% of recommended intake
++ 80-89% of recommended intake
+++ 70-80% of recommended intake
++++ Below 70% of recommended intake

Overall, the pattern of marginal intakes (calcium and iron, as well as magnesium and vitamin B_6 in some sites) in the Head Start-absent and non-Head Start groups was quite similar to that noted in the pretest sample, although somewhat less severe. In contrast, marginal nutrient intakes in the Head Start-present group were very few and much less severe--calcium intakes exceeded 100 percent of the standard in all sites, and iron intakes were above 94 percent of the standard in all sites. Furthermore, the prevalence and severity of problems in the Head Start-present group was substantially lower than would be expected from the previously cited reference data for comparable groups of preschool children (see Exhibit 6-5), especially in St. Clair and Mingo Counties.

In addition to the improvements in intake of calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12} noted for the Head Start-present group in the longitudinal analses, the cross-sectional analyses revealed that mean intakes of the Head Start-present group, and proportion of nutrient intake recommendation received, were significantly greater than either the Head Start-absent group or the non-Head Start group, for almost every nutrient examined, including iron (see Tables 6-12 through 6-23).* Interestingly enough, however, virtually no significant differences in intake or percentage of daily recommendation received were noted in comparisons between the Head Start-absent group and the non-Head Start group.

To further substantiate these apparent Head Start effects, a series of regression analyses focusing on nutrient intake were conducted (using the regression model and covariate set outlined in the discussion on analytic approach). All three groups (Head Start-present versus non-Head Start; Head Start-present versus Head Start-absent; Head Start-absent versus non-Head Start) were compared on intake of each nutrient. Detailed results of these analyses are reported in Appendix Tables 6-24 and 6-25. As the adjusted mean nutrient intakes in Exhibits 6-24 through 6-26 illustrate, across-site analyses revealed positive and statistically significant differences in intake between the Head Start-present and non-Head Start groups for all nutrients except fat and cholesterol. Similarly, across all sites, children

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*The additional findings noted in the cross-sectional sample are undoubtedly due to the additional power available in the cross-sectional analyses due to the vastly increased sample sizes (see Chapter Two). The same pattern of effects noted in the longitudinal analyses was found in the cross-sectional analyses. In addition, smaller, but significant, differences for other nutrients were noted as well.

Exhibit 6-24

Adjusted Mean Nutrient Intakes for Head Start-Present and Non-Head Start Children by Site

Variable	Posttested Head Start-present and non-Head Start Children (Samples A, B, and C) in:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P	NHS	HS-P	NHS	HS-P	NHS	HS-P	NHS	HS-P	NHS
Calories										
Mean Intake	1610	1538	2088[c]	1761	1525	1512	1874[c]	1580	1770[c]	1587
n	104	82	70	66	56	48	64	99	294	295
Protein (gm)										
Mean Intake	62.96	57.38	75.40[c]	61.48	55.71	52.94	71.45[c]	53.26	66.63[c]	56.09
n	103	84	71	67	54	48	68	100	296	299
Fat (gm)										
Mean Intake	63.46	63.05	81.91	74.87	64.58	66.88	70.96	65.83	69.95	66.11
n	102	83	70	67	56	48	63	99	291	297
Carbohydrate (gm)										
Mean Intake	199.95	186.73	267.00[c]	214.23	180.11	173.19	456.91[c]	195.91	223.21[c]	193.80
n	105	82	70	66	56	47	67	98	298	293
Calcium (mg)										
Mean Intake	942.71[c]	622.16	1056.77[c]	696.76	864.43[a]	706.38	1124.19[c]	750.33	1008.69[c]	685.56
n	105	83	70	66	54	47	68	100	296	296
Iron (mg)										
Mean Intake	10.55	10.19	12.99	11.64	9.34	8.95	11.46[c]	9.78	11.06[a]	10.32
n	103	76	69	67	53	46	65	99	293	288
Magnesium (mg)										
Mean Intake	216.98[b]	181.36	284.00[c]	200.84	193.19	168.26	346.85[c]	186.82	235.99[c]	184.12
n	109	92	70	67	56	48	68	99	300	306
Phosphorus (mg)										
Mean Intake	1125.83[c]	846.83	1300.14[c]	966.81	1016.43	923.49	1306.00[c]	1001.91	1201.00[c]	926.11
n	109	92	70	66	55	48	59	99	302	305
Log Vitamin A (IU)[d]										
Mean Intake	3.80[c]	3.51	7.31[c]	3.43	3.51	3.42	3.61[c]	3.38	3.68[b]	3.44
n	103	83	71	64	55	47	66	94	298	288
Vitamin A (IU)[d]										
Mean Intake	10301.39	4518.64	8083.03	3272.47	4015.96	3386.91	4862.06	2880.18	7016.53	3616.77
n	103	83	71	64	55	47	66	94	298	288
Thiamin (mg)										
Mean Intake	1.26	1.21	183.00	1.43	1.10	0.99	1.38[c]	1.11	1.30[a]	1.19
n	104	79	70	67	55	45	68	97	295	288
Riboflavin (mg)										
Mean Intake	2.00[c]	1.55	2.33[c]	1.62	1.64	1.53	1.90[c]	1.56	2.03[c]	1.55
n	98	81	71	64	53	48	68	99	280	292
Niacin (mg)										
Mean Intake	14.89	13.83	17.14	15.90	11.85	11.16	14.83[a]	12.24	14.45[a]	13.70
n	101	81	71	67	55	46	67	100	294	294
Vitamin B_6 (mg)										
Mean Intake	1.29	1.29	1.55[b]	1.18	1.18	1.17	1.39[a]	1.12	1.32[b]	1.18
n	102	78	68	67	55	48	67	98	292	292
Log Vitamin B_{12} (mcg)										
Mean Intake	0.58[c]	0.40	0.59[b]	0.46	0.51	0.45	0.56[c]	0.39	0.58[c]	0.42
n	90	82	66	65	54	49	68	98	278	294
Vitamin B_{12} (mcg)[d]										
Mean Intake	4.80	3.01	4.73	3.07	3.77	3.43	4.23	2.93	4.30	3.14
n	90	82	66	65	54	49	68	98	278	294
Vitamin C (mg)										
Mean Intake	117.30	132.14	190.54[a]	146.03	88.62	79.69	114.81[b]	80.35	125.90[a]	111.36
n	104	84	70	67	55	47	64	96	293	294
Cholesterol (mg)										
Mean Intake	324.73	281.44	431.13	355.64	313.45	347.42	298.50	339.25	340.61	331.38
n	100	82	70	65	56	49	69	99	295	295

[a] significance level $p \le .05$

[b] significance level $p \le .01$

[c] significance level $p \le .001$

[d] significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions for significance levels.

Exhibit 6-25

Adjusted Mean Nutrient Intakes for Head Start-Present and Head Start-Absent Children by Site

Variable	Posttested Head Start-present and Head Start-absent Children (Samples A, B, and C) in:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A
Calories										
Mean Intake	1610	1413	2088	1914^a	1523	1333	1874^c	1499	1770^c	1533
n	104	10	70	31	56	40	64	37	296	118
Protein (gm)										
Mean Intake	62.96^b	45.35	75.4	70.31	55.71^a	47.3	71.45^c	51.36	66.63^c	56.55
n	103	9	71	31	56	41	68	36	296	117
Fat (gm)										
Mean Intake	63.46	58.33	81.91	83.36	64.58	36.58	70.96	61.67	69.95^a	64.38
n	102	10	70	30	56	41	63	36	291	117
Carbohydrate (gm)										
Mean Intake	199.55	171.12	287.00^b	256.12	180.11	163.83	456.91^c	178.54	323.31^c	183.00
n	105	10	70	31	56	40	67	37	298	118
Calcium (mg)										
Mean Intake	942.71^c	443.82	1056.77^c	723.49	864.43^b	641.31	1124.19^c	698.8	1030.60^c	653.57
n	105	10	70	31	56	41	66	33	296	119
Iron (mg)										
Mean Intake	10.95	8.74	12.99	12.43	9.34	8.87	11.46^c	8.85	11.06^b	9.86
n	103	9	68	30	53	40	65	37	293	110
Magnesium (mg)										
Mean Intake	216.98^b	145.00	286.00^c	215.00	183.19^b	146.42	266.65^c	171.75	235.99^c	173.92
n	109	10	70	31	56	40	68	37	300	118
Phosphorus (mg)										
Mean Intake	1125.83^b	770.6	1300.14^b	1083.6	1014.43^b	814.05	1306.00^c	940.8	1201.00^c	900.26
n	109	10	70	31	55	41	69	37	303	119
Log Vitamin A (IU)										
Mean Intake	3.8^b	3.41	7.31^b	3.55	3.51^b	3.33	3.61^a	3.48	3.66^c	3.48
n	103	10	71	31	55	39	66	25	298	117
Vitamin A (IU)^d										
Mean Intake	10301.39	4394.46	8080.03	4143.28	4015.96	2937.98	4862.06	3987.80	7016.53	4339.00
n	103	10	71	31	55	39	66	25	298	117
Thiamin (mg)										
Mean Intake	1.30^b	1.20	1.26	1.23	1.53	1.49	1.1^a	0.94	1.38	1.17
n	106	10	70	30	55	39	68	35	295	114
Riboflavin (mg)										
Mean Intake	2.0^c	1.18	2.33^b	1.82	1.44	1.38	1.9^c	1.54	2.03^c	1.54
n	98	9	71	31	53	40	68	35	290	115
Niacin (mg)										
Mean Intake	14.89	12.19	17.14	17.48	11.85	10.36	14.83^a	12.14	14.45	13.39
n	101	9	71	29	55	39	67	33	294	110
Vitamin B_6 (mg)										
Mean Intake	1.29^b	1.26	1.55	1.33	1.18	106	1.36^a	1.12	1.32^a	1.17
n	102	10	68	29	55	41	67	34	292	113
Log Vitamin B^{12} (mcg)										
Mean Intake	0.58^c	0.19	0.59	0.58	0.51	0.45	0.59	0.46	0.56^c	0.46
n	90	9	66	31	56	40	60	37	278	117
Vitamin B_{12} (mcg)^d										
Mean Intake	4.60	1.95	4.73	4.30	3.77	3.13	4.23	3.76	4.30	3.55
n	90	9	66	31	56	40	60	37	278	117
Vitamin C (mg)										
Mean Intake	117.3	111.39	190.54	182.79	88.63	83.35	114.61	96.87	125.97	117.00
n	106	10	70	31	55	39	66	37	283	117
Cholesterol (mg)										
Mean Intake	324.73	257.4	431.13	388.07	313.45	316	288.5	345.71	360.61	338.95
n	100	9	70	31	56	41	69	37	295	118

[a] Significance level $p \leq .05$

[b] Significance level $p \leq .01$

[c] Significance level $p \leq .001$

[d] Significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions for significance levels.

Exhibit 6-26

Adjusted Mean Nutrient Intakes for Head Start-Absent and Non-Head Start Children by Site

Variable	Posttested Head Start-Absent and Non-Head Start Children (Samples A, B, and C) In:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-A	NHS	HS-A	NHS	HS-A	NHS	HS-A	NHS	HS-A	NHS
Calories										
Mean Intake	1412	1338	1916	1761	1323	1512	1499	1580	1533	1597
n	10	82	31	66	40	48	37	99	118	293
Protein (gm)										
Mean Intake	45.35	57.38	70.21	61.48	67.30	52.94	51.36	53.26	54.33	56.09
n	9	84	31	67	41	48	36	100	117	299
Fat (gm)										
Mean Intake	58.33	63.85	83.38	76.87	56.58	66.88	61.87	65.83	64.38	68.11
n	10	83	30	67	41	48	36	99	117	297
Carbohydrate (mg)										
Mean Intake	171.12	188.73	256.12	214.23	163.83	173.19	178.54	195.91	183.00	193.8
n	10	82	31	66	40	67	37	98	118	293
Calcium (mg)										
Mean Intake	643.82	622.16	733.69	696.76	641.31	706.38	698.8	750.32	653.57	685.56
n	10	83	31	66	41	67	33	100	119	296
Iron (mg)										
Mean Intake	8.74	10.19	12.43	11.66	8.87	8.95	8.85	9.78	9.86	10.32
n	9	76	28	67	40	66	37	99	110	288
Magnesium (mg)										
Mean Intake	165.00	181.36	215.0	200.84	146.42	168.26	171.75	186.82	173.92	184.12
n	10	92	31	67	40	48	37	99	118	306
Phosphorus (mg)										
Mean Intake	770.6	846.83	1063.6	966.81	814.05	923.49	949.8	1001.91	900.26	928.11
n	10	92	31	66	41	48	37	99	119	305
Log Vitamin A (IU)[a]										
Mean Intake	3.42	3.51	3.55	3.43	3.33	3.42	3.48	3.38	3.48	3.44
n	10	83	31	64	39	67	35	94	117	288
Vitamin A (IU)										
Mean Intake	4394.46	4318.64	4163.28	3272.47	2907.98	3386.91	3987.80	2880.18	4329.00	3616.77
n	10	83	31	64	39	67	35	94	117	288
Thiamin (mg)										
Mean Intake	1.20	1.21	1.23	1.43	1.49	0.99	0.94	1.11	1.17	1.19
n	10	79	30	67	39	65	35	97	114	288
Riboflavin (mg)										
Mean Intake	1.18	1.55	1.82	1.62	1.38	1.53	1.54	1.56	1.56	[illegible]
n	9	81	31	64	40	48	35	99	115	292
Niacin (mg)										
Mean Intake	12.19	13.83	17.48	15.90	10.36	11.16	12.16	12.24	13.39	13.70
n	9	81	29	67	39	46	33	100	110	294
Vitamin B_6 (mg)										
Mean Intake	1.26	1.29	1.32	1.18	106	1.17	1.12	1.12	1.17	1.18
n	10	78	28	67	41	48	34	99	113	292
Log Vitamin B_{12} (mcg)										
Mean Intake	0.19	0.40	0.38	0.46	0.45	0.45	C.46	0.39	0.46	0.42
n	9	82	31	65	40	49	37	98	117	284
Vitamin B_{12} (mcg)[a]										
Mean Intake	1.95	3.01	4.30	3.07	3.13	3.43	3.76	2.93	3.55	3.14
n	9	82	31	65	40	49	37	98	117	284
Vitamin C (mg)										
Mean Intake	111.39	132.14	182.79	146.03	83.35	79.69	96.87	80.35	117.0	111.36
n	10	84	31	67	39	67	37	96	117	294
Cholesterol (mg)										
Mean Intake	237.6	281.44	388.07	355.64	316.0	347.43	345.71	339.75	338.95	331.38
n	9	82	31	63	41	49	37	99	118	295

[a] Significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions.

intake between the Head Start-present and non-Head Start groups for all nutrients except fat and cholesterol. Similarly, across all sites, children in the Head Start-present group consumed significantly greater amounts of all nutrients except thiamin, niacin, vitamin C and cholesterol than children in the Head Start-absent group. In keeping with findings noted in comparisons of unadjusted group means, there were no significant differences between the Head Start-absent and non-Head Start groups for any of the nutrients evaluated.

Thus, even after considering the effect of other influential variables, the nutrient intake of children in the Head Start-present group was signifcantly greater that that of children in the other two groups for almost all nutrients.* Specifically, children in the Head Start-present group received approximately:

- 10 percent more calories than non-Head Start children and 13 percent more calories than Head Start-absent children.
- 12 percent more protein than non-Head Start children and 18 percent more protein than Head Start-absent children.
- 13 percent more carbohydrate than non-Head Start children and 18 percent more carbohydrate than Head Start-absent children.
- 32 percent more calcium than non-Head Start children and 35 percent more calcium than Head Start-absent children.
- 7 percent more iron than non-Head Start children and 11 percent more iron than Head Start-absent children.
- 22 percent more magnesium than non-Head Start children and 26 percent more magnesium than Head Start-absent children.
- 23 percent more phosphorus than non-Head Start children and 25 percent more phosphorus than Head Start-absent children.
- 49 percent more vitamin A than non-Head Start children and 38 percent more vitamin A than Head Start-absent children.
- 24 percent more riboflavin than non-Head Start children and 24 percent more riboflavin than Head Start-absent children.

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*All differences reported were significant at $p < 0.05$ or less. Refer to Exhibits 6-24 through 6-26 for actual intake data.

- 11 percent more vitamin B_6 than both non-Head Start children and Head Start-absent children.
- 28 percent more vitamin B_{12} than non-Head Start children and 21 percent more vitamin B_{12} than Head Start-absent children.
- 12 percent more vitamin C than non-Head Start children and 7 percent more vitamin C than Head Start-absent children.

The presence and magnitude of differences in nutrient intake varied greatly from site to site. The greatest number of differences were noted in Mingo County, where findings paralleled those reported for the across-site analyses. The fewest differences were noted in Maricopa County, where calcium intake was the only significant difference between the Head Start-present and non-Head Start groups, while Head Start-present versus Head Start-absent group differences were noted for protein, calcium, magnesium, phosphorus and vitamin A. The smaller number of differences noted in Maricopa County may be due to the decreased scope of Head Start meal service (only one meal and snack) in this site and the tendency for total daily intake of all children in Maricopa County to be less than that of children in other sites, as previously discussed.

It appears that the meals and snacks provided by the Head Start nutrition program had a very significant and positive effect on the nutrient intake of participating children. Overall, no evidence of nutritional inadequacies in the diets of Head Start-present children were detected. (Even the inadequacies that might be expected from pretest baseline data and previously cited reference data were not evident.)

Impact on Distribution of Percent of Nutrient Intake Standard Received. As Exhibits 6-27 and 6-28 illustrate, the distributions of percent of nutrient intake standard received for the Head Start-present group were also substantially different from both the non-Head Start and Head Start-absent groups. Additionally, distributions in the Head Start-present group were substantially different from those seen in the pretest sample (see Exhibit 6-6). In all cases, these differences were the result of greater numbers of children in the Head Start-present group consuming diets that provided 100 percent or more of the recommended amounts of nutrients or greater numbers of children in the non-Head Start or Head Start-absent groups consuming diets that provided lower percentages of the recommendations.

Exhibit 6-27

Percent of Nutrient Intake Standard Received in 24-Hour Intake with Unadjusted Comparisons Between Children Present in Head Start on Day of Recall and Non-Head Start Children by Site

Nutrients	Percent of Posttested Head Start-Present and Non-Head Start Children (Samples A, B, and C) in:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P n=110	NHS n=90	HS-P n=72	NHS n=68	HS-P n=58	NHS n=52	HS-P n=72	NHS n=104	HS-P n=312	NHS n=314
Calories										
0-33%	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.3
34-66%	3.6	7.8	0.0	0.0	10.3	19.2	1.4	6.7	3.5	7.0
67-99%	29.1	17.8	15.3	14.7	39.7	36.5	13.9	32.7	24.4	25.2
100%+	67.3	74.4	84.7	85.3	50.0	42.3	84.7^b	60.6	72.1	66.9
Protein										
0-33%	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
34-66%	0.0	0.0	0.0	0.0	0.0	9.6	0.0	3.8	0.0	2.9
67-99%	0.9	4.4	0.0	4.4	10.3	15.4	2.8	10.6	2.9	8.3
100%+	99.1	94.4	100.0	95.6	89.7^a	75.0	97.2^a	85.6	97.1^c	88.5
Calcium										
0-33%	0.0	7.8	1.4	14.7	0.0	9.6	1.4	5.8	0.6	8.9
34-66%	7.3	40.0	4.2	22.1	13.8	26.9	4.2	26.9	7.1	29.6
67-99%	18.2	25.6	19.4	29.4	31.0	21.2	9.7	33.7	18.9	28.3
100%+	74.5^c	26.7	75.0^c	33.8	55.2^a	42.3	84.7^c	33.7	73.4^c	33.1
Iron										
0-33%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.3	0.8
34-66%	21.8	30.0	15.3	12.5	20.7	29.3	19.4	28.2	19.6	24.6
67-99%	41.8	50.0	19.4	18.8	32.8	31.7	26.4	41.0	31.4	32.8
100%+	35.5	20.0	65.3	68.8	46.6	36.6	54.2	30.8	48.7	41.8
Magnesium										
0-33%	0.0	0.0	0.0	0.0	1.7	7.3	0.0	0.0	0.3	2.5
34-66%	1.8	30.0	0.0	12.5	12.1	39.0	2.8	25.6	3.5	27.0
67-99%	23.6	40.0	8.3	21.9	41.4	31.7	13.9	33.3	21.2	30.3
100%+	74.5^c	30.0	91.7^c	65.6	44.8^b	22.0	83.3^c	41.0	75.0^c	40.2
Phosphorus										
0-33%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.8
34-66%	0.0	10.0	1.4	6.3	3.2	14.6	1.4	10.3	1.6	12.3
67-99%	10.9	30.0	4.2	28.1	20.7	36.6	11.1	25.6	11.2	30.3
100%+	89.1^c	60.0	94.4^c	65.6	76.1^a	46.3	87.5^b	64.1	87.2^c	56.6
Vitamin A										
0-33%	0.0	10.0	1.4	6.3	1.7	12.2	1.4	2.6	1.0	7.6
34-66%	1.8	10.0	1.4	3.1	12.1	22.0	2.8	10.3	3.8	12.3
67-99%	11.8	30.0	11.1	18.8	17.2	31.7	8.3	17.9	11.9	23.6
100%+	86.4^c	50.0	86.1	71.9	69.0^b	34.1	87.5	69.2	83.3^c	55.6
Thiamin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.8
67-99%	3.6	0.0	9.7	9.4	10.3	14.6	5.6	7.7	6.7	9.8
100%+	96.4	100.0	90.3	90.6	89.7	82.9	94.4	92.3	93.3	89.3

Significance of Chi-Squared Test for Independence (3df)

^{a} = $p \leq .05$

^{b} = $p \leq .01$

^{c} = $p \leq .001$

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Exhibit 6-27 (Continued)

Percent of Nutrient Intake Standard Received in 24-Hour
Intake with Unadjusted Comparisons Between Children Present in Head Start
on Day of Recall and Non-Head Start Children by Site

Nutrients	Percent of Posttested Head Start-Present and Non-Head Start Children (Samples A, B, and C) in:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P n=110	NHS n=90	HS-P n=72	NHS n=68	HS-P n=58	NHS n=52	HS-P n=72	NHS n=104	HS-P n=312	NHS n=314
Riboflavin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.3
67-99%	0.0	3.6	2.8	13.2	1.7	7.7	0.0	10.6	1.0	9.2
100%+	100.0^b	96.4	97.2^a	86.8	98.3	92.3	100.0^b	88.5	99.0^c	90.4
Niacin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	2.7	1.1	0.0	4.4	3.4	3.8	2.8	10.6	2.2	5.4
67-99%	15.5	10.0	23.6	14.7	31.0	28.8	38.9	31.7	25.6	21.3
100%+	81.8	88.9	76.4	80.9	65.5	67.3	58.3	57.7	72.1	73.2
Vitamin B_6										
0-33%	0.0	2.2	0.0	1.5	1.7	7.7	1.4	6.7	0.6	4.5
34-66%	13.6	16.7	2.8	19.1	27.6	26.9	9.7	22.1	12.8	20.7
67-99%	27.3	16.7	20.8	35.3	36.2	23.1	26.4	26.0	27.2	24.8
100%+	59.1	64.4	76.4^c	44.1	34.5	42.3	62.5^a	45.2	59.3^c	50.0
Vitamin B_{12}										
0-33%	0.0	3.3	1.4	2.9	3.4	5.8	1.4	6.7	1.3	4.8
34-66%	4.5	17.8	1.4	7.4	5.2	13.5	2.8	10.6	3.5	12.4
67-99%	10.0	16.7	6.9	14.7	15.5	21.2	5.6	16.3	9.3	16.9
100%+	85.5^c	62.2	90.3	75.0	75.9	59.6	90.3^b	66.3	85.9^c	65.9
Vitamin C										
0-33%	1.8	6.7	0.0	11.8	1.7	9.6	0.0	14.4	1.0	10.8
34-66%	6.4	7.8	0.0	14.7	10.3	9.6	4.2	11.5	5.1	10.8
67-99%	7.3	6.7	1.4	0.0	17.2	13.5	8.3	8.7	8.0	7.0
100%+	84.5	78.9	98.6^c	73.5	70.7	67.3	87.5^c	65.4	85.9^c	71.3

Significance of Chi-Squared Test for Independence (3df)

^a = p ≤ .05

^b = p ≤ .01

^c = p ≤ .001

Exhibit 6-28

Percent of Nutrient Intake Standard Received in 24-Hour Intake with Unadjusted Comparisons Between Children Present In and Absent From Head Start on Day of Recall by Site

Nutrients	Greene & Humphreys Counties HS-P n=110	Greene & Humphreys Counties HS-A n=10	St. Clair County HS-P n=72	St. Clair County HS-A n=32	Maricopa County HS-P n=58	Maricopa County HS-A n=41	Mingo County HS-P n=72	Mingo County HS-A n=39	All Sites HS-P n=312	All Sites HS-A n=122
	Percent of Posttested Head Start-Present and Head Start-Absent Children (Samples A, B, and C) In:									
Calories										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	3.6	10.0	0.0	0.0	10.3	29.3	1.4	7.7	3.5	13.1
67-99%	29.1	40.0	13.3	12.5	39.7	46.3	13.9	33.3	24.4	32.8
100%+	67.3	50.0	86.7	87.5	50.0[b]	24.4	84.7[b]	59.0	72.1[c]	54.1
Protein										
0-33%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.8
34-66%	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.6	0.0	2.5
67-99%	0.9	20.0	0.0	0.0	10.3	17.1	2.8	5.1	2.9	9.0
100%+	99.1[c]	80.0	100.0	100.0	89.7	75.6	97.2	92.3	97.1[c]	87.7
Calcium										
0-33%	0.0	10.0	1.4	3.1	0.0	9.8	1.4	5.1	0.6	6.6
34-66%	7.3	60.0	4.2	25.0	13.8	34.1	4.2	28.2	7.1	32.0
67-99%	18.2	30.0	19.4	43.8	31.0	31.7	9.7	28.2	18.9	33.6
100%+	74.5[c]	0.0	75.0[c]	28.1	55.2[c]	24.4	84.7[c]	38.5	73.4[c]	27.9
Iron										
0-33%	0.9	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.3	0.8
34-66%	21.8	30.0	15.3	12.5	20.7	29.3	19.4	28.2	19.6	24.6
67-99%	41.8	50.0	19.4	18.8	32.8	31.7	26.4	41.0	31.4	32.8
100%+	35.5	20.0	65.3	68.8	46.6	36.6	54.2	30.8	48.7	41.8
Magnesium										
0-33%	0.0	0.0	0.0	0.0	1.7	7.3	0.0	0.0	0.3	2.5
34-66%	1.8	30.0	0.0	12.5	12.1	39.0	2.8	25.6	3.5	27.0
67-99%	23.6	40.0	8.3	21.9	41.4	31.7	13.9	33.3	21.2	30.3
100%+	74.5[c]	30.0	91.7[c]	65.6	44.8[b]	22.0	83.3[c]	41.0	75.0[c]	40.2
Phosphorus										
0-33%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.8
34-66%	0.0	30.0	1.4	6.3	5.2	14.6	1.4	10.3	1.6	12.3
67-99%	10.9	30.0	4.2	28.1	20.7	36.6	11.1	25.6	11.2	30.3
100%+	89.1[c]	40.0	94.4[c]	65.6	74.1[a]	46.3	87.5[b]	64.1	87.2[c]	56.6
Vitamin A										
0-33%	0.0	10.0	1.4	6.3	1.7	12.2	1.4	2.6	1.0	7.4
34-66%	1.8	10.0	1.4	3.1	12.1	22.0	2.8	10.3	3.8	12.3
67-99%	11.8	30.0	11.1	18.8	17.2	31.7	8.3	17.9	11.9	23.8
100%+	86.4[c]	50.0	86.1	71.9	69.0[b]	34.1	87.5	69.2	83.3[c]	56.6
Thiamin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.8
67-99%	3.6	0.0	9.7	9.4	10.3	14.6	5.6	7.7	6.7	9.8
100%+	96.4	100.0	90.3	90.6	89.7	82.9	94.4	92.3	93.3	89.3

Significance of Chi-Squared Test for Independence (3df)

[a] = p ≤ .05

[b] = p ≤ .01

[c] = p ≤ .001

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Exhibit 6-28 (Continued)

Percent of Nutrient Intake Standard Received in 24-Hour Intake with Unadjusted Comparisons Between Children Present In and Absent from Head Start on Day of Recall by Site

Nutrients	Percent of Posttested Head Start-Present and Head Start-Absent Children (Samples A, B, and C) In:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P n=110	HS-A n=10	HS-P n=72	HS-A n=32	HS-P n=58	HS-A n=41	HS-P n=72	HS-A n=39	HS-P n=312	HS-A n=122
Riboflavin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
67-99%	0.0	0.0	2.8	9.4	1.7	4.9	0.0	5.1	1.0	5.7
100%+	100.0	100.0	97.2	90.6	98.3	95.1	100.0^{a}	94.9	99.0^{b}	94.3
Niacin										
0-33%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34-66%	2.7	0.0	0.0	3.1	3.4	7.3	2.8	5.1	2.2	4.9
67-99%	15.5	10.0	23.6	21.9	31.0	31.7	38.9	25.6	25.6	25.4
100%+	81.8	90.0	76.4	75.0	65.5	61.0	58.3	69.2	72.1	69.7
Vitamin B_6										
0-33%	0.0	0.0	0.0	0.0	1.7	4.9	1.4	5.1	0.6	3.3
34-66%	13.6	40.0	2.8	21.9	27.6	43.9	9.7	17.9	12.8	29.5
67-99%	27.3	10.0	20.8	21.9	36.2	24.4	26.4	35.9	27.2	26.2
100%+	59.1	50.0	76.4^{b}	56.3	34.5	26.8	62.5	41.0	59.3^{c}	41.0
Vitamin B_{12}										
0-33%	0.0	30.0	1.4	0.0	3.4	2.4	1.4	5.1	1.3	4.9
34-66%	4.5	20.0	1.4	6.3	5.2	14.6	2.8	2.6	3.5	9.0
67-99%	10.0	20.0	6.9	9.4	15.5	17.1	5.6	15.4	9.3	14.8
100%+	85.5^{c}	30.0	90.3	84.4	75.9	65.9	90.3	76.9	85.9^{b}	71.3
Vitamin C										
0-33%	1.8	20.0	0.0	3.1	1.7	14.6	0.0	7.7	1.0	9.8
34-66%	6.4	10.0	0.0	0.0	10.3	12.2	4.2	10.3	5.1	8.2
67-99%	7.3	0.0	1.4	0.0	17.2	17.1	8.3	10.3	8.0	9.0
100%+	84.5^{a}	70.0	98.6	96.9	70.7	56.1	87.5^{a}	71.8	85.9^{c}	73.0

Significance of Chi-Squared Test for Independence (3df)

^{a} = $p \leq .05$

^{b} = $p \leq .01$

^{c} = $p \leq .001$

(Most frequently 34 to 66% and 67 to 99%.) Once again, patterns of the non-Head Start and Head Start-absent groups were not significantly different for any nutrient; nor were they markedly different from distributions of the pretest sample.

As Exhibits 6-27 and 6-28 demonstrate, greater numbers of children in the Head Start-present group received 100 percent or more of the recommended intake of almost every nutrient; all but a few of these differences were statistically significant.* The most sizable differences (across all sites) were noted for calcium, magnesium, phosphorus, vitamin A, vitamin B_6, vitamin B_{12}, and vitamin C.

As might be expected, there was considerable variation among sites in the presence and significance of these distributional differences. The greatest number of significant differences was noted in Mingo County, where distributions for the Head Start-present group were significantly different (greater percentages of children in the high end of the distributions) from the non-Head Start group for all nutrients except thiamin and niacin (see Exhibit 6-27). In keeping with findings discussed previously, differences in Maricopa County were less frequent on a nutrient-by-nutrient basis and also less substantial than in any of the three other sites.

Although neither 24-hour recall data nor the nutrient intake reference standards (RDAs) allow us to interpret the implications of individual intakes below 100 percent of the recommendation, the strong differences in distributional patterns among groups are noteworthy. The shift of Head Start-present children into the higher end of the distribution for so many nutrients indicates that the meals and snacks provided through the Head Start nutrition program had a strong influence on the overall adequacy of their diets. The potential risk for the Head Start-present group, as a whole, is significantly reduced as a result. The lack of difference between the Head Start-absent group and non-Head Start groups, on the other hand, indicates that any potential risk of marginal intake for children in the lower end of the distribution is virtually the same for both groups. Clearly, the diets consumed by children who were absent from Head Start are quite different from the diets of children who were present--it seems, then, that meals provided through the Head Start nutrition program are responsible for the distributional differences noted among the three treatment groups.

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*Data for the Head Start-absent versus non-Head Start comparisons are listed in Tables 6-26 (across sites) and 6-27 (within site).

Exhibit 6-29

Unadjusted Mean Nutrient Densities Below RDA Reference Standard for Posttested Head Start Children Present on Day of Recall By Site

Nutrient	Posttested Head Start-Present Children (Samples A, B, and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Protein					
Calcium		+			
Iron	+	+	+	+	+
Magnesium					
Phosphorus					
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6	+	+	+	+	+
Vitamin B_{12}					
Vitamin C					
Cholesterol[a]	+	+			

+ = group mean below nutrient density standard of RDA-referenced diet.

[a] + = group mean above nutrient density standard suggested in the U.S. Dietary Goals.

Exhibit 6-30

Unadjusted Mean Nutrient Densities Below RDA Reference Standard for Posttested Head Start Children Absent on Day of Recall By Site

Nutrient	Posttested Head Start-Absent Children (Samples A, B and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Protein					
Calcium	+	+	+	+	+
Iron	+	+	+	+	+
Magnesium		+			+
Phosphorus	+	+			
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6		+	+	+	+
Vitamin B_{12}					
Vitamin C					
Cholesterol[a]		+	+	+	+

+ = group mean below nutrient density standard of RDA-referenced diet.

[a]+ = group mean above nutrient density standard suggested in the U.S. Dietary Goals.

Exhibit 6-31

Unadjusted Mean Nutrient Densities Below RDA Reference Standard for Posttested Non-Head Start Children By Site

Nutrient	Posttested Non-Head Start Children (Samples A, B, and C) In:				
	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Protein					
Calcium	+	+	+	+	+
Iron	+	+	+	+	+
Magnesium		+	+		
Phosphorus		+			
Vitamin A					
Thiamin					
Riboflavin					
Niacin					
Vitamin B_6		+	+	+	+
Vitamin B_{12}					
Vitamin C					
Cholesterol[a]			+	+	+

+ = group mean below nutrient density standard of RDA-referenced diet.

[a] + = group mean above nutrient density standard suggested in the U.S. Dietary Goals.

In summary, distributions of percent of nutrient intake standard received for most nutrients differed markedly among the three treatment groups. In general, children in the Head Start-present group more frequently consumed diets supplying 100 percent of the recommended amounts of most nutrients. The data clearly indicate that the potential risk for problems of deficient nutrient intakes is substantially lower for the Head Start-present group than for either of the other two groups. The lack of agreement between distributions of nutrient intake noted for the Head Start-present and Head Start-absent groups suggests that the meals and snacks provided by Head Start have an important impact on the overall adequacy of children's diets.

Impact on Nutrient Density. Exhibits 6-29 through 6-31 illustrate problems of diets low in nutrient density noted for the three posttest groups. Nutrient densities of the RDA reference diet were again used as benchmarks in evaluating the nutrient density data. Tables 6-28 through 6-33 present more detailed data, including unadjusted comparisons between groups.

In keeping with results reported for the longitudinal analyses, there was an improvement in calcium density from pretest to posttest for the Head Start-present groups in all sites but St. Clair County (refer to Exhibit 6-7). No improvement in nutrient density for calcium was noted for either the Head Start-absent or non-Head Start groups in any of the four sites. Diets low in iron and vitamin B_6 densities persisted for all groups of children in each of the four study sites. Diets of children in St. Clair County appeared to be the most imbalanced overall, with both the Head Start-absent and non-Head Start groups consuming diets low in nutrient density for calcium, iron, magnesium, phosphorus, and vitamin B_6. Diets of the Head Start-absent group in St. Clair County were also high in cholesterol density.

Overall, diets consumed by the Head Start-present group were high in mean nutrient density for protein, calcium, magnesium, phosphorus, vitamin A, riboflavin and vitamin B12 than diets consumed by either the Head Start-absent or non-Head Start groups. Diets of Head Start-present children were also lower in concentrations of fat than were diets consumed by children in the non-Head Start group; and were lower in concentrations of both fat and cholesterol than diets consumed by children in the Head Start-absent group. There were no significant differences in nutrient density between the non-Head Start and Head Start-absent groups in either across- or within-site analyses.

In addition to the differences in mean nutrient density noted above, there were also clear and consistent differences from pretest to posttest and among groups in the cross-sectional sample in the percentages of individual children consuming diets low in nutrient density for calcium, magnesium, phosphorus, vitamin A, riboflavin, vitamin B_{12} and vitamin C, as Exhibit 6-32 illustrates. Across all sites, the percentage of Head Start-present children consuming such diets was significantly lower than the percentage at pretest (see Exhibit 6-8) or the percentage in either the Head Start-absent or non-Head Start groups. Findings varied from site to site; however, the percentage of children receiving diets poorly balanced in calcium, phosphorus, magnesium and riboflavin was consistently lower for the Head Start-present group in all sites. As discussed previously, many of these differences in nutrient density are presumably due to the addition of milk and other dairy products, through the Head Start nutrition program, to the diets of children in the Head Start-present group.

Following the protocol described previously, multiple regression analyses were undertaken to further validate the Head Start effects noted in the unadjusted comparisons described in the preceding paragraphs. Results are reported in Tables 6-34 through 6-35).

Regression results in the cross-sectional analyses differed somewhat from the results on the longitudinal analyses. Overall, Head Start-present children consumed diets higher in nutrient density for protein, calcium, magnesium, phosphorus, vitamin A, riboflavin and niacin than non-Head Start children. Head Start-present children's diets were also lower in concentrations of fat, as demonstrated in Exhibits 6-34 through 6-36.

Diets of Head Start-absent and non-Head Start children were somewhat higher in iron density, although this difference just reached significance in the across-site analyses ($p \leq 0.05$) and was not significant in any within-site analyses. Clearly, iron density remains a problem for all groups of children who were evaluated in this study. The fact that there were so few problems in iron status noted in the biochemical evaluation (see Chapter Seven) makes the relative importance of shortcomings in overall iron intake and iron density difficult to interpret. Presumably, the supplemental iron received by many children (see Chapter Seven) is partially responsible for the lack of correlation between dietary intake of iron and hematologic

Exhibit 6-32

Prevalence of Diets Low in Nutrient Density[a,b] for Posttested Head Start-Present, Head Start-Absent and Non-Head Start Children By Site

Nutrient	Posttested Children (Samples A, B, and C) in:														
	Greene & Humphreys			St. Clair County			Maricopa County			Kings County			All Sites		
	HS-P (n=110)	HS-A (n=10)	NHS (n=89)	HS-P (n=7)	HS-A (n=32)	NHS (n=67)	HS-P (n=57)	HS-A (n=39)	NHS (n=49)	HS-P (n=72)	HS-A (n=39)	NHS (n=97)	HS-P (n=312)	HS-A (n=122)	NHS (n=314)
Protein															
Number	0	0	1	0	0	1	0	0	0	1	0	4	1	0	6
Percent	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	0.0	0.9	0.0	3.8	0.3	0.0	1.9
Calcium															
Number	37[e]	9	70	35[e]	23	33	23	25	32	29[d]	27	71	124[e]	84	228
Percent	33.6	90.0	78.7	49.3	71.9	60.1	41.1	61.0	64.0	41.4	69.2	68.3	40.4	68.9	73.5
Iron															
Number	102	9	79	69	26	62	36	33	46	69	34	97	295	105	286
Percent	94.6	100.0	96.3	98.6	89.7	91.2	90.0	100.0	93.9	97.2	97.1	94.2	97.0	95.9	91.5
Magnesium															
Number	17[e]	6	47	16[d]	21	41	25	25	30	19[c]	21	54	77[e]	73	172
Percent	15.3	60.0	52.8	22.5	65.6	60.3	43.1	62.5	58.8	27.9	53.8	52.4	25.1	60.3	54.8
Phosphorus															
Number	2[e]	3	41	14[e]	21	36	9	17	19	14	14	29	38[e]	57	125
Percent	1.8	30.0	46.1	19.7	65.6	53.7	13.6	41.5	37.3	19.7	35.9	28.2	12.6	46.7	40.3
Vitamin A															
Number	14[e]	3	32	35[e]	14	10	16	21	15	19[c]	12	42	66[e]	63	126
Percent	13.0	30.0	36.0	53.8	19.4	31.3	28.1	53.8	30.6	26.4	30.8	43.4	38.3	30.4	41.3
Thiamin															
Number	19[c]	0	23	21	10	17	20	14	16	17[c]	10	40	77	34	98
Percent	17.6	0.0	27.1	29.6	32.3	25.0	35.1	35.9	33.3	24.6	27.0	39.6	25.2	29.1	31.8
Riboflavin															
Number	0	1	8	4	3	14	1	4	4	0	4	14	5	12	40
Percent	0.0	11.1	9.2	5.6	9.4	21.5	1.8	10.0	7.8	0.0	10.8	13.7	1.7	10.2	13.1
Niacin															
Number	24	1	13	20	8	14	21	17	17	31	12	43	96	38	89
Percent	22.6	11.1	14.9	27.8	26.7	20.6	36.8	43.6	34.7	44.3	34.3	43.3	31.5	33.6	28.9
Vitamin B_6															
Number	68	3	31	49	22	54	40	27	28	58	26	72	213	78	205
Percent	64.2	30.0	60.7	71.0	73.9	79.4	70.2	65.9	54.9	82.9	66.7	69.9	71.2	67.2	67.0
Vitam. B_{12}															
Number	12[e]	6	42	12[c]	8	24	8	10	13	9[e]	7	38	41[e]	31	117
Percent	12.8	66.7	48.3	17.9	25.0	36.4	14.3	25.0	26.4	12.7	17.9	38.0	14.2	25.8	38.4
Vitamin C															
Number	20	3	18	2[e]	5	18	16	18	18	26	9	41	55[c]	35	95
Percent	18.3	30.0	20.0	2.8	15.6	26.5	28.1	46.2	36.7	36.0	23.1	41.0	18.2	29.2	30.9
Cholestrl.															
Number	60	6	57	34	17	39	39	19	34	60[e]	17	36	193	59	176
Percent	57.1	66.7	64.8	47.9	53.1	59.1	57.2	48.3	46.2	83.3	43.6	34.9	63.1	48.8	57.1

[a] Based on RDA reference Diet (See Appendix Note 6-3).

[b] Percentages may not always reflect percent of total sample size, since outlying cases were excluded on a nutrient-by-nutrient basis.

[c] HS-P vs. NHS difference significant at p≤.05.

[d] HS-P vs. NHS difference significant at p≤.01.

[e] HS-P vs. NHS difference significant at p≤.001.

[f] HS-P vs. HS-A difference significant at p≤.05.

[g] HS-P vs. HS-A difference significant at p≤.01.

[h] HS-P vs. HS-A difference significant at p≤.001.

status.* On the other hand, it may be that the RDA standards for iron are excessive, as has been suggested by other investigators (Williams, Hennemann and Fox, 1977; Hegsted, 1982).

The additional iron consumed by Head Start children (see Exhibits 6-24 and 6-25) apparently came from the additional calories (food) the children consumed rather than diets higher in nutrient density for iron. This finding may have implications for Head Start policymakers. In particular, policymakers may be interested in recent research that has greatly expanded our understanding of iron nutriture. By carefully considering new information on the factors that influence the absorption of dietary iron, diets superior in iron density (the amount of available iron) could be constructed.** The absorption of iron from alternative protein sources (foods other than meat, fish or poultry) can be substantially increased when consumed in the presence of animal tissue (meat, fish, poultry) or vitamin C (ascorbic acid) (Cook, Morck, Skikne and Lynch, 1981; Hallberg, 1981). Since alternate protein sources (grains and legumes) are generally lower in calories, if the amount of iron absorbed from these foods can be increased, the result will be a diet with higher concentrations of available iron relative to caloric content.

Simple models for calculating the estimated amounts of absorbable iron available in any given meal are now available (Food and Nutrition Board, National Academy of Sciences, 1980). The Food and Nutrition Board suggests in the most current publication of the Recommended Dietary Allowances (1980) that this factor, commonly referred to as bioavailability of ingested iron, be considered in planning and developing diets (meals). Close attention to this issue in the planning and implementation of the Head Start nutrition

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*Multiple regression analyses attempting to control for the influence of dietary supplements still failed to demonstrate a relationship between iron intake and iron status, as discussed in Chapter Seven. This lack of correlation is in fact not surprising, since 24-hour recall data reflects nutrient intake over the short term, whereas hematologic measures are long-term indicators of nutritional status, and may be influenced by a number of other factors (see Chapter Seven).

**Typically, only 10 percent (approximately) of ingested dietary iron is actually absorbed (Food and Nutrition Board, National Academy of Sciences, 1980). Several factors, including iron status of the individual, type of iron-source food (animal sources versus non-animal sources), and characteristics of other foods ingested along with the iron-source foods, have been shown to significantly increase or decrease the proportion of ingested iron that is actually absorbed (Monsen, 1978).

Exhibit 6-33

Adjusted Mean Nutrient Densities for Head Start-Present and Non-Head Start Children by Site

Variable	Posttested Children (Samples A, B, and C) In:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-P	NHS	HS-P	NHS	HS-P	NHS	HS-P	NHS	HS-P	NHS
Protein (gm)										
Mean	39.33^{a}	36.74	36.11	34.42	37.15	33.03	36.36^{a}	33.44	37.55^{a}	34.79
n	103	86	71	67	54	48	68	100	296	299
Fat (gm)										
Mean	39.39	40.78	38.92^{b}	42.97	41.92	43.59	38.30^{a}	41.29	39.67^{c}	41.96
n	102	83	70	67	56	48	63	99	291	297
Carbohydrate (gm)										
Mean	124.35	123.71	129.28^{b}	120.49	119.49	117.62	125.53	123.92	125.40	122.60
n	105	82	70	66	56	47	67	98	298	293
Calcium (mg)										
Mean	593.35^{c}	404.09	510.50^{c}	394.28	564.17^{a}	483.23	580.49^{c}	473.33	574.42^{c}	433.30
n	105	83	70	66	54	47	67	100	296	296
Iron (mg)										
Mean	6.38	6.62	6.14	6.64	6.23	6.81	5.87	6.15	6.21^{a}	6.53
	103	76	69	67	53	66	68	99	293	288
Magnesium (mg)										
Mean	139.80^{c}	123.29	137.04^{c}	110.96	126.40^{a}	112.39	129.96^{a}	118.66	136.42^{c}	116.44
n	105	83	70	67	58	68	65	99	296	297
Phosphorus (mg)										
Mean	725.08^{c}	586.61	626.09^{b}	546.57	669.77	613.22	669.12	637.56	675.50^{c}	593.12
n	105	83	70	66	55	48	68	99	298	296
Vitamin A (IU)										
Mean	6798.00^{c}	2963.49	4003.64^{c}	1908.90	2865.97	2231.37	2346.25^{a}	1872.73	4197.64^{c}	2253.11
n	103	83	71	64	55	47	69	94	298	288
Thiamin (mg)										
Mean	.75	.83	.73	.79	.72	.68	.72	.70	.73	.73
n	104	79	70	67	55	45	66	97	293	288
Riboflavin (mg)										
Mean	1.27^{c}	1.02	1.11^{b}	.92	1.10	1.03	1.07	.99	91.15^{c}	.98
n	98	81	71	64	53	48	68	99	290	297
Niacin (mg)										
Mean	9.0	9.96	8.18	8.79	7.84	7.87	7.67	7.77	8.16^{c}	8.67
n	101	81	71	67	55	46	67	100	294	294
Vitamin B_6 (mg)										
Mean	.79	.85	.76	.67	.80	.80	.71	.71	.76	.75
n	102	78	68	67	55	48	67	99	292	292
Vitamin B_{12} (mcg)^{d}										
Mean	2.95^{c}	1.95	2.23^{b}	1.76	2.39	2.25	2.14^{c}	1.92	2.43	1.96
n	90	82	66	65	54	69	68	98	278	296
Vitamin C (mg)										
Mean	75.01	82.25	96.86	80.6	60.77	55.08	62.35	53.55	72.38	69.93
n	104	86	70	67	55	47	64	96	293	294
Cholesterol (mg)										
Mean	206.32	184.73	207.26	194.19	197.97	233.48	152.77^{b}	218.28	190.96	206.35
n	100	82	70	65	56	49	69	99	295	295

[a] Significance level $p \leq .05$

[b] Significance level $p \leq .01$

[c] Significance level $p \leq .001$

[d] Significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions.

Exhibit 6-34

Adjusted Mean Nutrient Densities for Head Start-Present and Head Start-Absent Children by Site

	Posttested Children (Samples A, B, and C) In:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
Variable	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A	HS-P	HS-A
Protein (gm)										
Mean	39.53	33.08	36.11	37.03	37.15	33.16	38.56	35.24	37.53	35.91
n	103	9	71	31	34	41	68	36	296	117
Fat (gm)										
Mean	39.59	39.08	38.92[c]	44.00	41.92	40.89	38.30[a]	42.28	39.67[a]	41.63
n	102	10	70	30	36	41	63	36	291	117
Carbohydrate (gm)										
Mean	124.3	127.3	129.28[c]	113.95	119.49	124.08	120.33	118.49	123.4	121.23
n	105	10	70	31	36	40	67	37	298	118
Calcium (mg)										
Mean	593.35[c]	342.34	510.50[c]	602.76	564.17	486.67	580.49[b]	678.27	574.42[c]	641.7
n	105	10	70	31	34	41	67	37	296	119
Iron (mg)										
Mean	6.38	6.91	6.14	6.46	6.23	6.84	5.87	6.36	6.21[a]	6.62
n	103	9	69	28	33	40	68	33	293	110
Magnesium (mg)										
Mean	139.8	118.77	137.04[c]	112.99	126.40[a]	109.95	129.94[b]	113.33	134.42[c]	113.26
n	105	10	70	31	38	40	65	37	296	118
Phosphorus (mg)										
Mean	723.08[c]	536.15	626.09	569.4	669.77	608.94	649.12	629.9	673.50[c]	598.33
n	105	10	70	31	33	41	68	37	298	119
Vitamin A (IU)[d]										
Mean	10301.39[b]	4394.46	8083.03[b]	3272.67	6015.96[b]	3386.91	4862.06[a]	2880.18	7016.33[b]	3616.77
n	103	10	71	31	33	39	69	37	298	117
Thiamin (mg)										
Mean	.75[a]	.92	.73	.76	.72	.72	.72	.78	.73[a]	.79
n	104	10	70	30	35	39	.66	33	295	114
Riboflavin (mg)										
Mean	1.27[a]	.97	1.11	.96	1.10	1.05	1.07	1.06	91.15[b]	1.04
n	98	9	71	31	33	40	68	33	290	115
Niacin (mg)										
Mean	9.0	9.71	8.18	8.95	7.84	7.66	7.67	8.32	8.16	8.77
n	101	9	71	29	33	39	67	33	294	110
Vitamin B_6 (mg)										
Mean	.79[c]	.89	.76	.69	.80	.79	.71	.76	.76	.74
n	102	10	68	28	33	41	67	34	292	113
Vitamin B_{12} (mcg)										
Mean	2.95	3.43	2.23	2.24	2.39	2.35	2.14[a]	2.41	2.43	2.30
n	90	9	66	31	34	40	68	37	278	117
Vitamin C (mg)										
Mean	75.01	86.67	96.86	98.49	60.77	63.03	62.35	56.92	72.38	78.96
n	104	10	70	31	35	39	64	37	293	117
Cholesterol (mg)										
Mean	206.32	181.76	207.26	211.86	197.97	245.06	152.77[c]	272.78	190.96	226.40
n	100	9	70	31	36	41	69	37	295	118

[a] Significance level p≤.05

[b] Significance level p≤.01

[c] Significance level p≤.001

[d] Significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions.

Exhibit 6-35

Adjusted Mean Nutrient Densities for Head Start-Absent and Non-Head Start Children by Site

Variable	Posttested Children (Samples A, B, and C) In:									
	Greene and Humphreys County		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS-A	NHS	HS-A	NHS	HS-A	NHS	HS-A	NHS	HS-A	NHS
Protein (gm)										
Mean	33.08	36.74	37.03	34.42	33.16	33.03	32.34	33.44	33.91	34.79
n	9	84	31	67	41	48	36	100	117	299
Fat (gm)										
Mean	39.08	40.78	44.00	42.9	40.89	43.59	42.28	41.29	41.63	41.96
n	10	83	30	67	41	48	36	99	117	297
Carbohydrate										
Mean	127.3	123.71	113.95	120.48	124.08	117.62	118.49	125.92	121.25	122.6
n	10	82	31	66	40	47	37	98	118	293
Calcium (mg)										
Mean	342.34	406.09	402.76	394.28	488.67	483.03	478.27	473.33	441.7	433.3
n	10	83	31	66	41	47	37	100	119	296
Iron (mg)										
Mean	6.91	6.62	6.46	6.64	6.84	6.81	6.36	6.15	6.62	6.53
n	9	76	28	67	40	46	33	99	110	288
Magnesium (mg)										
Mean	118.77	123.29	112.99	110.96	109.95	112.39	115.55	118.66	113.26	116.44
n	10	83	31	67	40	48	37	99	118	297
Phosphorus (mg)										
Mean	536.13	586.61	569.4	546.57	608.94	613.2	629.9	627.34	98.33	593.62
n	10	83	31	66	41	48	37	99	119	296
Vitamin A (IU)[d]										
Mean	2672.13[a]	2963.49	2119.82	1908.90	2089.08	2251.37	2346.23	2791.38	2063.90	2233.11
n	10	83	31	64	39	47	37	94	117	288
Thiamin (mg)										
Mean	.92	.83	.76	.79	.72	.68	.78[a]	.70	.79	.75
n	10	79	30	67.0	39	45	33	97	114	288
Riboflavin (mg)										
Mean	.97	1.02	.96	.92	1.05	1.03	1.46	.99	1.06	.98
n	9	81	31	64	40	48	33	99	115	292
Niacin (mg)										
Mean	9.71	9.94	8.95	8.79	7.66	7.87	8.52	7.77	8.77	8.62
n	9	81	29	67	39	46	33	100	110	294
Vitamin B_6 (mg)										
Mean	.89	.83	.69	.67	.79	.80	.76	.71	.74	.75
n	10	78	28	67	41	48	34	99	113	292
Vitamin B_{12} (mcg)										
Mean	1.43	1.95	2.24[a]	1.76	2.35[a]	2.25	2.41	1.92	2.43[a]	1.96
n	9	82	31	65	40	49	37	98	117	294
Vitamin C (mg)										
Mean	84.67	82.23	98.49	80.6	63.03	55.08	56.92	53.55	78.96	69.95
n	10	84	31	67	39	47	37	96	117	294
Cholesterol (mg)										
Mean	181.76	184.73	211.86	194.19	243.06	233.68	272.78	212.28	226.40	206.35
n	9	82	31	65	41	49	37	99	118	295

[a] Significance level p≤.05

[b] Significance level p≤.01

[c] Significance level p≤.001

[d] Significance level not tested on absolute intake, since substantial skewness in the distribution invalidates the assumptions underlying F-tests for statistical significance. Variable was transformed to logarithmic scale (Base 10) to test significance--refer to results for log distributions.

program would be highly beneficial to participating children if satisfaction of the RDA for iron, without provision of excess calories, is to remain a program goal.

Such changes in menu-planning may yield other benefits as well. Despite previously mentioned differences in proportion of calories obtained from protein, fat and carbohydrate, most of the children examined in this study (both Head Start and non-Head Start) could benefit from minor changes in their diets that would decrease the proportion of calories provided by protein and fat, while simultaneously increasing the proportion of calories contributed by complex carbohydrates. Such changes would not only bring children's diets more in line with recommendations currently made by many nutrition educators, but would also increase the overall nutrient density of children's diets since complex carbohydrate foods are generally excellent sources of many nutrients. Evidence has indicated that the vast majority of children consumed much more protein than they actually require. This tendency was strongest in the Head Start-present group, as Exhibits 6-33 through 6-35 illustrated. Substantially greater numbers of Head Start-present children in all sites consumed diets with a disproportionately high amount of calories provided by protein. Diets of greater numbers of Head Start-present children in Greene and Humphreys Counties were also disproportionately low in calories from carbohydrate. This finding is of concern not only because protein is an expensive source of energy, but also because research has suggested that the disproportionately large amounts of protein consumed by Americans may have long term health implications (Pipes, 1977; Food and Nutrition Board, 1980).

An over-emphasis on protein intake in the Head Start performance standards may be inappropriate. If Head Start menus were planned using alternative sources of protein and iron more frequently, and if these foods were served along with some smaller portion of meat, fish or poultry and/or serving of a food high in vitamin C, several nutritional benefits would accrue. First, the total protein content of the meal may be decreased, but the protein-to-calorie ratio is likely to be increased, since the amount of fat (and therefore calories) would also be reduced. Second, the total amount of absorbable iron would be increased, as described previously. Third, the use of such foods will simultaneously increase consumption of complex carbohydrates (i.e., those obtained from whole grains or legumes) and potentially increase the overall nutrient density of the diet. Finally, redirecting the

Exhibit 6-36

Pattern of Participation in Federal Food Assistance Programs for Posttested Head Start and Non-Head Start Families by Site

Pattern of Food Assistance Program Participation		Posttested Families (Samples A,B,C) In:									
		Greene & Humphreys Counties		St. Clair County[a]		Maricopa County		Mingo County		All Sites	
		HS n=119	NHS n=93	HS n=105	NHS n=80	HS n=104	NHS n=56	HS n=112	NHS n=104	HS n=440	NHS n=333
Food Stamps Only	n	24	23	22	30	42	22	32	29	120	104
	%	20.2	24.7	21.0	37.5	40.4	39.3	28.6	27.9	27.3	31.2
WIC Only	n	20	16	16	5	3	1	7	5	46	27
	%	16.8	17.2	15.2	6.2	2.9	1.8	6.3	4.8	10.4	8.1
Both Food Stamps and WIC	n	55	43	62	37	19	6	36	22	172	108
	%	46.2	46.2	59.0	46.3	18.3	10.7	32.1	21.1	39.1	32.5
No Food Assistance	n	20	11	5	8	40	27	37	48	102	94
	%	16.8	11.9	4.8	10.0	38.4	48.2	33.0	46.2	23.2	28.2

Significance of Chi-Square d Test for Independence (3df)

[a] $x^2 = 10.82$; $p = 0.013$.

focus of some meals to center around alternative sources of protein would be in keeping with the Head Start program goals to increase Head Start children's experience with and consumption of a wide variety of foods.

Finally it is interesting to note that the latest Thrifty Meal Plan proposed for Food Stamp users by the U.S. Department of Agriculture includes diets planned with energy source patterns that would deemphasize traditional protein sources (meat, fish and poultry) and encourage use of alternative protein sources and complex carbohydrate foods. Low-income families would be advised to purchase more whole grain products, legumes, fruits and vegetables, and purchase less meat, poultry and fish. (CNI Weekly Report, October 28, 1982).

Patterns and Effects of Participation in Food Assistance Programs. Analyses were undertaken to determine any group differences in patterns of food assistance program participation that might be attributable to Head Start intervention. Overall participation patterns at posttest (Samples A, B and C) were similar for Head Start and non-Head Start groups in each site, with the exception of St. Clair County (see Exhibit 6-36). Families of Head Start children in St. Clair County more frequently participated in the WIC program, either alone or in conjunction with the Food Stamps program. This result is not surprising, since the nutritionist who most frequently consults with the Head Start program in St. Clair County is a chief nutritionist with the local WIC program. In addition, the director of the WIC program is a member of the Health Advisory Council for the St. Clair County Head Start program. It seems as though this well-developed relationship between the Head Start and WIC programs may work to the benefit of those St. Clair County Head Start families who are eligible for WIC services.

In order to understand the relative importance of these programs in the diets of Head Start children, we investigated two principal questions:

- did families with different food assistance progarm participation patterns (e.g., Food Stamps only vs. WIC only) differ substantially from one another, in important background characteristics, either across or within sites? and
- did families' food assistance program participation patten make a significant difference in children's nutrient intake?

In general, families participating in both the Food Stamps and WIC programs were the most disadvantaged, while families who did not participate in any food assistance programs were the least disadvantaged. As Exhibit 6-37 illustrates, the four groups followed a similar progression from most disadvantaged to least disadvantaged for each of the SES-related background variables examined. The Food Stamps and WIC group was most similar to the Food Stamps only group; both of these groups tended to be more disadvantaged than either the WIC only group or the no food assistance group:

- across all sites, families participating in both Food Stamps and WIC or Food Stamps alone had lower per capita incomes and therefore lower income percentiles. Household members were less frequently employed, and mother's tended to have less education.
- across all sites, families who participated in the WIC program only or who participated in no federal food assistance programs more frequently had one or more household members employed, tended to have higher per capita incomes and mothers who were better educated.*

These patterns are not surprising when one considers that the WIC program is targeted toward groups with high nutritional risk (e.g., teenage mothers, high-risk pregnancies, low birth weight infants, anemic or poorly growing preschoolers) and until recently focused much less on income-eligibility criteria than the Food Stamp program. Therefore, it is quite conceivable that families participating in WIC alone may be very different from families participating only in the Food Stamps program or in both Food Stamps and WIC programs.

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*These patterns were consistent in Greene and Humphreys Counties and St. Clair County; however, two exceptions were noted in Maricopa County and Mingo County: the pattern of mother's education was reversed in both of these sites, with mothers in families receiving no food assistance in Maricopa County receiving less education, and mothers in families receiving only WIC benefits in Mingo County having the least education.

Similarly, the Food Stamps only group in Mingo County appears to contradict the patterns noted in other sites. It should be kept in mind, however, that many of the families reporting no employment and current participation in the Food Stamps program in this site were families of striking coal miners who would normally have fallen into the no food assistance group. (See Chapter Two for further discussion of this situation and the effect it had on SES-related variables in the Mingo County site.)

Exhibit 6-37

Characteristics of Various Federal Food Assistance Program Participation Pattern Groups by Site

		Posttested Families (Samples A, B, C) In:				
SES Variable	Participation Pattern	Greene & Humphreys Counties n=212	St. Clair County n=183	Maricopa County n=160	Mingo County n=216	All Sites n=773
Someone in Family Employed	Food Stamps n $\%^a$	19 40.4	12 23.4	38 39.4	18 29.5	87^e 38.8
	WIC Only n $\%^b$	27 75.0	17 81.0	4 100.0	3 25.0	51 69.9
	Food Stamps and WIC n $\%^c$	47 48.0	14 14.1	13 60.0	14 24.1	90 32.1
	No Food Assistance n $\%^d$	21 67.7	9 69.2	63 94.0	60 70.6	53 78.1
Mean Household Per Capita Income	Food Stamps Only $\$\bar{X}$	747.02	1023.80	912.44	2083.20	1234.03^f
	WIC Only $\$\bar{X}$	1439.00	1865.89	1362.50	1384.59	1585.44
	Food Stamps and WIC $\$\bar{X}$	607.68	871.21	930.69	929.83	796.95
	No Food Assistance $\$\bar{X}$	1472.48	1989.25	1890.56	2121.06	1909.77
Mean Household Income Percentile	Food Stamps Only	46.10	67.52	37.83	57.71	67.31^g
	WIC Only	68.92	67.67	69.43	31.33	65.80
	Food Stamps and WIC	39.86	39.11	37.10	28.09	36.98
	No Food Assistance	60.02	71.23	62.24	56.28	60.03
Mother's Education (years)	Food Stamps Only	10.29	10.92	10.09	10.64	10.47^h
	WIC Only	11.17	12.52	12.33	9.50	11.33
	Food Stamps and WIC	10.67	11.34	9.24	10.10	10.59
	No Food Assistance	11.49	12.28	9.81	10.85	10.75

[a] As percent of families receiving only Food Stamps benefits

[b] As percent of families receiving WIC benefits

[c] As percent of families receiving both Food Stamp and WIC benefits

[d] As percent of families receiving no food assistance benefits

Significance of Chi-Squared Test for Independence (3 df):

[e] $X^2 = 119.99$; $p = 0.00$

Significance Level:

[f] $p = 0.00$

[g] $p = 0.00$

[h] $p = 0.05$

To investigate how different participation patterns may have effected Head Start children's nutrient intake, two separate sets of analyses were run, evaluating the Head Start-absent and Head Start-present groups individually. The nutrient content of the diets consumed at home by each group of Head Start children was evaluated using the regression model previously described. An additional analysis was run on the full cross-sectional sample (both Head Start and non-Head Start groups) to detect any differences in overall nutrient density of at-home diets attributable to variations in food assistance program participation patterns.

Few significant differences were detected in across-site analyses. There was no consistent pattern in any of the sites: in some cases there were no significant differences to speak of, in others the most-disadvantaged groups (Food Stamps only and Food Stamps plus WIC groups) had lower intakes than the least-disadvantaged groups (WIC only and no food assistance groups), and in yet other instances, the most-disadvantaged groups had higher intakes than the least-disadvantaged groups. Any differences that were detectable were substantively small and just reached significance.* These few "differences" are most likely attributable to chance, since there were even fewer differences than what one would expect to find by chance, given the number of analyses that were run.

Although no coherent pattern of differences among participatation patterns could be detected, there is an important observation to be made about families' participation in these food assistance programs. As Exhibit 6-36 demonstrated, well over 50 percent of the children in each group participated in one or more federal food assistance programs; in two sites this level appoached 90 percent. These programs obviously played an important role in the nutrient intakes of Head Start and Head Start-eligible children reported in this evaluation. This participation may have also been an important factor in the lack of difference between the Head Start-absent and non-Head Start group--these groups did not receive meals and snacks from Head Start, but utilization of other food assistance benefits was essentially equivalent for both groups.

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*It should be noted here that differences evaluated in multiple regression analysis were differences between the mean for each participation pattern group and the overall group mean. A more complicated contrast coding scheme, similar to that used for the three-level Head Start comparison would have been required to test for differences in all of the possible between-group comparisons. Such analyses were beyond the scope of the present evaluation and therefore were not undertaken here.

The importance of such programs in the nutrient intakes reported for both Head Start and non-Head Start children cannot be underestimated. As other investigators have cautioned, we must consider the influence of participation in programs, although unmeasured in this evaluation, and realize that any future changes in participation patterns due to program cut-backs or changes in eligibility requirements would be likely to have an important impact on the diets of these children and all Head Start and Head Start-eligible children (Hegsted, 1982).

Impact of Parent Education on Nutrient Content and Nutritional Quality of Diets Provided to Head Start Children at Home. Using the regression model described previously, analyses were undertaken to determine whether participation in Head Start parent meetings and routine (at least once a month) visits to children's classrooms had any impact on parents' feeding behaviors, and consequently on either the nutrient content or nutritional quality of the diets provided to children at home. Two dichotomous variables designating attendance at parent meetings and routine classroom visits were added to the standard set of covariates and factors. Impact on the following dependent measures were evaluated:

- total nutrient content of diets consumed at home by Head Start-present children;
- total nutrient content of diets consumed at home by Head Start-absent children;
- overall nutrient density of at-home diets for both groups of Head Start children; and
- overall nutrient density of at-home diets for both groups of Head Start children, compared to that of non-Head Start children (This analysis was an attempt to uncover any Head Start influence on parents that was not reflected in parent participation in meetings or classroom activites, as reported in this evaluation).

No significant differences in either the nutrient content or nutrient density of diets provided at home by participating Head Start parents and non-participating Head Start parents were detected. Interestingly enough, however, several significant differences in nutrient density were detected between the total Head Start group and the non-Head Start group. Across all sites, the at-home diets of Head Start children (present and absent groups combined) were higher in density of vitamins A and C and lower in cholesterol density than diets of non-Head Start children (see Exhibit 6-38). Diets of Head Start children were also lower in total fat density, and thereby had lower percentages of calories contributed by fat. At the same time, at-home diets of Head Start children were higher in total carbohydrate density, and thereby had increased percentages of calories contributed by carbohydrate. Although the magnitude of these differences is small (e.g., Head Start children received two to five percent less of their calories from fat), the pattern of differences is interesting. As has been discussed previously, changes in dietary habits to decrease fat and cholesterol consumption and increase consumption of complex carbohydrates are currently encouraged in most nutrition education efforts. It is not unlikely that such changes would be the focus of Head Start nutrition education services, whether formal or informal. Along the same lines, increased consumption of fruits and vegetables high in vitamins C and/or A is also a common nutrition education theme.

As might be expected, differences between Head Start and non-Head Start groups in nutritional quality of diets consumed at home varied greatly from site to site. A larger number of differences were observed in Greene and Humphreys Counties than were observed in any of the other sites--in Greene and Humphreys Counties the at-home diets of Head Start children were also higher in concentrations of calcium, phosphorus, riboflavin and vitamin B_{12}. Fewer differences were noted in St. Clair County and Maricopa County, sites where significant numbers of parents had reported involvement in Head Start classroom activities and in parent education sessions focusing on food and nutrition. It is difficult to interpret the apparent conflict in these findings. The data strongly suggest, however, that prevalence and influence of Head Start nutrition education services for parents varies greatly among programs. There is apparently a strong, positive influence in Greene and Humphreys Counties, and a much less pronounced influence in the other three sites.

Exhibit 6-38

Adjusted Mean Nutrient Densities of Diets Consumed at Home for Head Start and Non-Head Start Children by Site

Nutrient	Posttested Head Start and Non-Head Start Children (Samples A, B and C) In:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS n=115	NHS n=82	HS n=100	NHS n=67	HS n=96	NHS n=67	HS n=104	NHS n=99	HS n=408	NHS n=297
Fat (gm)	38.50[a]	41.01	41.97	42.74	39.43[b]	43.23	40.40	41.33	40.20[c]	41.86
Carbohydrate (gm)	129.89[a]	123.28	121.22	120.63	127.89[a]	118.23	124.21	126.05	125.56[b]	122.80
Calcium (mg)	399.46[a]	350.73	426.42	375.48	485.35	491.19	469.41	472.41	438.11	433.33
Phosphorus (mg)	582.33[a]	540.77	573.72	532.88	618.79	619.08	627.39	634.75	593.74	594.80
Vitamin A (I.U.)	3371.06[c]	2945.48	2557.43[c]	1908.89	2576.27	2251.37	2637.73[c]	1872.73	2814.75[a]	2251.75
Riboflavin (mg)	1.03[b]	0.92	1.01	0.88	1.04	1.03	1.01	0.98	0.99	0.98
Vitamin B_{12} (mcg)	1.95[b]	1.63	2.10[c]	1.76	2.25	2.25	2.16	1.92	2.12	1.95
Vitamin C (mg)	92.26	84.46	99.20	80.59	62.85	56.46	65.41[c]	54.69	79.66[a]	69.38
Cholesterol (mg)	162.26[b]	189.28	193.46	196.89	207.08[a]	233.77	204.10	209.82	195.54[a]	205.24

[a] Significance level $p \leq .05$

[b] Significance level $p \leq .01$

[c] Significance level $p \leq .001$

Conclusions

At pretest, mean intakes of children in all sites provided 100 percent or more of the daily recommendation for protein, vitamin A, thiamin, riboflavin, vitamin B_{12} and vitamin C. Mean intakes of calcium were marginal in all sites except Mingo County; iron intakes were marginal in all sites. In some sites mean intakes of calories, magnesium, niacin and vitamin B_6 were also marginal. In spite of adequate mean intakes, substantial numbers of children consumed diets supplying less than 66 percent of the recommended intake for all nutrients except protein and thiamin. Children in Greene and Humphreys Counties consumed diets supplying the least calcium, iron, phosphorus, vitamin B_{12} and vitamin C.

Analyses of nutrient intake at posttest revealed many significant differences between the group of children who received Head Start meals and snacks, the non-Head Start group and the group of Head Start children who had not received Head Start meals and snacks in both the longitudinal and cross-sectional samples. In the longitudinal sample, children who had received Head Start meals and snacks consumed significantly greater amounts of calcium, magnesium, phosphorus, riboflavin, vitamin A and vitamin B_{12} than either non-Head Start children or Head Start children who had not consumed Head Start meals and snacks. As a result, pretest to posttest improvement in the number of children receiving 100 percent of the recommended daily intake for these nutrients was substantially greater for the Head Start-present group. Results varied across sites, and were greatest in Greene and Humphreys Counties, where pretest intakes had been lowest. The fewest results were found in Maricopa County, where the Head Start nutrition program served fewer meals and snacks than were served in the other programs.

In the cross-sectional sample, substantially more of the children who had received meals and snacks from Head Start received 100 percent or more of the recommended daily intake for almost every nutrient. The greatest number of differences were noted in Mingo County; the fewest in Maricopa County. Calcium and iron were, once again, the most marginal nutrients in all sites. Nonetheless, the mean calcium intake of Head Start children (who had received Head Start meals and snacks) in all sites was well above recommended levels, whereas mean calcium intakes of all groups of non-Head Start children and Head Start children who had not received Head Start meals and snacks failed to supply 100 percent of the daily recommendation. Similarly, mean iron intake for Head Start children exceeded 100 percent of the recommended amount in two sites and satisfied 94 percent of the recommendations in the two other sites. In contrast, mean iron intakes were marginal in much of the non-Head Start group as well as in the group of Head Start children who did not consume meals and snacks provided through Head Start.

Diets consumed by Head Start and non-Head Start children were generally similar in nutrient density for protein, thiamin, niacin, vitamin B_6 and cholesterol. Across all sites, Head Start children's diets were generally higher in concentrations of calcium, magnesium, phosphorus, vitamin A, riboflavin and vitamin B_{12} in both longitudinal and cross-sectional samples.

The Head Start nutrition program was found to be successfully achieving many of its goals. Significant differences between Head Start and non-Head Start families in changes in the pattern of participation in food assistance programs from pretest to posttest suggest that Head Start may play an important role as facilitator, by putting families in need of food assistance benefits in touch with appropriate persons or agencies. Reported incidence of parent education services focusing on food and nutrition was limited in all study sites. Nonetheless, in most sites, the nutrient density of diets provided to Head Start children at home was superior to that of non-Head Start children for vitamins A and C and cholesterol and, to a lesser extent, for fat and carbohydrate.

The meal service component of the Head Start nutrition program served meals and snacks that successfully provided the mandated proportions of children's average daily nutrient needs (one-third of the RDA for part-day programs; one-half to two-thirds of the RDA for full-day programs). In addition, Head Start meals and snacks accounted for 40 to 50 percent of children's total nutrient intake.

CHAPTER SEVEN

BIOCHEMICAL EVALUATION

Biochemical Indicators

Extensive analysis of the blood samples obtained from the children participating in the evaluation was carried out in an effort to obtain an objective and accurate assessment of important indicators of their health status. These analyses provide information about the iron status and serum cholesterol levels of children in all four Head Start Health Evaluation sites, the vitamin A status of children in two sites, and the vitamin C levels of children in one site. This chapter on the biochemical assessment component of the Head Start Health Evaluation describes the data collection methodology, discusses the medical/scientific terminology necessary for an understanding of the data presented, explains the statistical analyses, and presents the findings.

Data Collection Methodology

Venipuncture blood samples were drawn for 92 percent of the children at pretest and for all but nine (1%) children at posttest. Blood was obtained by finger stick from the remaining children. Experienced medical technologists drew the blood and determined hematocrits on site using a portable centrifuge and reader. The remaining assays were performed at the Nutritional Biochemistry Laboratory of the University of Nebraska Medical Center. These included measures of serum cholesterol levels and iron, vitamin A, and vitamin C status.

Exhibit 7-1 shows the biochemical tests included in the comprehensive assessment performed as part of the Head Start Health Evaluation. These were chosen because of their relevance to an understanding of the status of the target population. That is, it has been generally agreed that iron deficiency, a widespread problem in the United States, is especially common among young children and is likely to have adverse effects (Cook and Finch, 1979; Dallman, Siimes, and Stekel, 1980). Therefore, a detailed investigation of

Exhibit 7-1

Laboratory Assays Performed at Pretest and Posttest

Assay	Pretest	Posttest
Iron status measures	All Sites	All Sites
Hematocrit Hemoglobin FEP TIBC Iron TS Ferritin		
Serum Cholesterol	All Sites	All Sites
Vitamin A status measures	All Sites	Greene & Humphreys Counties Maricopa County
Vitamin A (retinol) B-carotene		
Vitamin C	Not done	Maricopa County

the iron status of the children in all four sites was included in the present evaluation. The seven measures of iron status included in this investigation are: hematocrit, hemoglobin, free erythrocyte protoporphyrin (FEP), serum iron, total iron binding capacity (TIBC), transferrin saturation (TS), and ferritin. These contribute to a comprehensive picture of a child's iron status, reflect changes in levels of iron in different body compartments, and are affected at different points in the development of iron depletion. Because there is great interest in the relationship between diet and heart disease and very limited information about lipid levels in young children, serum cholesterol levels were also determined in all sites. Assays for vitamins A and C, however, were restricted to samples from those sites in which there was some reason to believe that levels of these vitamins might be low. Previous research (the Ten-State Nutrition Survey) indicated that vitamin A levels are sometimes low in a low-income Hispanic population and vitamin C levels are low in some low-income groups. Two measures of vitamin A status (serum retinol and B-carotenc) were determined in two sites and vitamin C assays were only performed on the Maricopa County samples.

Exhibit 7-2 presents the names of the blood analyses performed as indicators of iron status, cholesterol, vitamin A, and vitamin C levels and a basic definition of each measure with a brief explanation of its use in an assessment of health and nutritional status. Exhibit 7-3 shows the cutoff points for unacceptable values based upon standards currently accepted in the literature. Although biochemical measures are objective and have been obtained using accepted, standardized laboratory procedures, the "interpretation of laboratory data will always be a matter for some disagreement . . . The 'cut-off points' selected as representing some degree of risk of deficiency are, and will presumably always be, a matter of some argument and arbitrary decision" (Christakis, 1973, p. 38). Hence, the cutoff points selected for use in the present discussion are intended to represent reasonable reference points for interpreting findings of the comprehensive Head

Exhibit 7-2

Biochemical Measures[a]

Name of Iron Status Measure and Unit of Measurement	Definition	Use in Health/Nutritional Status Assessment
Hematocrit %	Percentage of the total blood volume which is made up of red blood cells (after the blood sample has been centrifuged or separated into its components)	Indirect measure of iron status, since iron is needed to produce red blood cells. Technical simplicity is a big advantage, but uncertainty as to hematocrit's sensitivity as an indicator of iron deficiency limits its value as the sole measure of iron status.
Hemoglobin gm/dl.	Concentration of the component of red blood cells which contains iron and carries oxygen throughout the body.	Functional (indirect) measure of iron status which provides information on the levels of the iron-containing pigment hemoglobin in the body. Technically simple. Provides information on the end result of severe and/or long-term deficiency but is a relatively insensitive indicator of milder degrees of iron depletion. Hemoglobin and serum ferritin together monitor the two ends of the spectrum of iron status. Lacks sensitivity because of wide range of values in normal (non-anemic) subjects.

[a] gm = gram (equal to 0.035 ounces)

dl = deciliter or 100 ml

mcg = microgram or 10^{-6} gram (one millionth of a gram)

ng = nanogram, or 10^{-9} grams (one billionth of a gram)

Exhibit 7-2

Biochemical Measures[a] (continued)

Name of Iron Status Measure and Unit of Measurement	Definition	Use in Health/Nutritional Status Assessment
Free Erythrocyte Protoporphyrin (FEP) mcg/dl.	Concentration of protoporphyrin in the red blood cell which has not combined with iron to form heme, a component of hemoglobin.	Functional indicator of iron status. Protoporphyrin accumulates in the red blood cell when insufficient iron is available. Assesses adequacy of iron supply for hemoglobin synthesis. Lacks specificity, because levels are elevated in iron deficiency, inflammatory disease, and lead exposure.
Serum iron mcg/dl.	Concentration of iron in the blood (almost all bound to the protein transferrin)	Direct measure of iron available to the body to make hemoglobin. May be subject to error because of contaminating iron and methodological difficulties. Diurnal variation in serum iron (high values in morning, low at night) may produce false positive and negative results.
Total Iron Binding Capacity (TIBC) mcg/dl.	Capacity of blood proteins to carry iron; reflects the concentration of transferrin, which binds and transports iron.	Useful to distinguish iron deficiency from inflammatory disease; in iron deficiency TIBC increases and with inflammatory disease, it decreases. May be subject to error because of contaminating iron or methodological difficulties.
Transferrin Saturation (TS) %	Percent saturation of transferrin, the iron-carrying protein in the blood. Calculated by dividing serum iron concentration by TIBC and multiplying by 100.	Indicator of adequacy of iron available for hemoglobin production. Easy to calculate but subject to large variations in serum iron concentrations among individuals with possible result of many false positive and negative diagnoses. Not specific to iron deficiency; may also decrease in inflammatory disease. For survey purposes, should be used only in combination with other tests.
Ferritin ng/ml.	Concentration of ferritin, an iron-protein complex in the blood.	Allows the estimation of body iron stores because plasma ferritin concentration has a linear relationship to stores. Methodology complex and expensive. Invaluable measure because of its ability to detect the first stage of iron deficiency (diminished stores). Low levels are specific to iron deficiency.
Mean Corpuscular Hemoglobin Concentration (MCHC) %	Concentration of hemoglobin in the average red cell. Calculated by dividing the hemoglobin concentration by the volume of packed red blood cells (hematocrit) and multiplying by 100.	A red cell index which reflects the average hemoglobin concentration per unit volume of packed red cells. The least sensitive of the red cell indices in its ability to detect iron deficiency. The only red cell index available without sophisticated equipment.
Cholesterol mg/dl.	Concentration of cholesterol in the blood.	Commonly used measure of cholesterol status of an individual. Its value as a predictor of heart disease and its relationship to long-term dietary intake are unclear.
Vitamin A (retinol) mcg/dl.	Concentration of retinol or vitamin A in the blood.	Indicator of long-term vitamin A intake and resulting status. Remains fairly stable in spite of short-term dietary inadequacies.
B-Carotene mcg/dl.	Concentration of B-carotene, from which vitamin A can be produced.	Indicator of intake of vitamin A precursor (from which vitamin A can be produced). Reflects recent intake of carotene-containing foods; low levels indicate limited intake of these foods and not a vitamin A deficiency.
Vitamin C mg/dl.	Vitamin C level in the blood.	Indicator of vitamin C available to the body. Reflects recent intake of vitamin C-containing foods.

Exhibit 7-3

Cutoff Points for Biochemical Measures[a]

Measure	Cutoff	Reference
Hematocrit	< 34%	Christakis (1973)
Hemoglobin	< 11 gm/dl (or 10.5 gm/dl)	Christakis (1973)
Free erythrocyte protoporphyrin	> 49 mcg/dl whole blood	CDC (1978)
Serum iron	< 40 mcg/dl	Christakis (1973)
Total iron binding capacity	> 400 mcg/dl	Singer et al. (1980)
Transferrin saturation	< 16.0%	Cook and Finch (1979); Dallman et al. (1980)
Ferritin	< 10 ng/ml	Dallman et al. (1980)
Cholesterol	> 20C mg/dl	Owen (1974); Srinivasan (1978)
Mean Corpuscular Hemoglobin Contration	< 30%	Nutrition Canada (1973)
Vitamin A	< 20 mcg/dl	Christakis (1973)
B-carotene	< 70 mcg/dl	Smith (1980); NY State (1947)
Vitamin C	< 0.4 mg/dl.	NY State (1947)

[a] gm = gram, or 0.035 ounces

dl = deciliter or 100 ml.

mcg = microgram or 10^{-6} grams (one millionth of a gram)

ng = nanogram, or 10^{-9} grams (one billionth of a gram)

Start Health Evaluation assessment of child health. Comparisons have also been made with results of other surveys, such as the Ten-State Nutrition Survey and the First National Health and Nutrition Examination Survey.

Functions of Biochemical Indicators

To be able to understand and interpret the findings presented in this chapter, it is necessary to be familiar with the functions of the substances whose adequacy can be assessed through the biochemical indicators of iron status, cholesterol, vitamin C and vitamin A levels.

Iron Status. In the Head Start Health Evaluation, the following measures have been used to assess iron status:

- Serum ferritin concentration;
- Serum iron concentration;
- Total iron binding capacity (TIBC);
- Transferrin saturation (TS);
- Free erythrocyte protoporphyrin level (FEP);
- Hemoglobin concentration; and
- Hematocrit level.

In addition, mean corpuscular hemoglobin concentration (MCHC) was calculated according to the definition shown in Exhibit 7-2.

Iron in the body is found in two types of compounds: those involved in metabolism (or the building up and breaking down of materials by the body) and those whose function is primarily storage. The former group consists of proteins involved in the transport and use of oxygen. Hemoglobin, which carries oxygen throughout the body, is the major iron-containing compound in this group. Iron storage compounds serve the important function of maintaining iron levels in the body. When iron in the diet becomes inadequate, iron from the storage forms of iron--ferritin and hemosiderin--is made available for incorporation into hemoglobin and other compounds. When adequate storage iron is not available to compensate for inadequate dietary intake, the functional compounds such as hemoglobin cannot be produced in normal quantities.

The adverse effect that inadequate iron intake has on body iron content is not an all-or-none phenomenon, however. There is instead a physiological progression which can be monitored through the use of biochemical measures. As shown in Exhibit 7-4, each stage in the progression has at least one laboratory test which can be used to identify it. The progression is generally thought to consist of four stages:

- Stage 1--depletion of iron stores: a decrease in serum ferritin concentration reflects a decrease in storage iron.
- Stage 2--exhaustion of iron stores and decrease in transport iron: decreased serum iron levels and increased iron binding capacity produce a decrease in transferrin iron saturation, which is indicative of impaired iron transport.
- Stage 3--decreased synthesis of hemoglobin and other iron-containing compounds: impaired hemoglobin synthesis is evidenced by an increase in erythrocyte protoporphyrin, a decrease in hemoglobin concentration and lower hematocrit readings (the percentage of total blood volume consisting of red blood cells decreases and in iron deficiency the cells also decrease in size).
- Stage 4--reduction in tissue iron concentrations: lower tissue iron concentrations demonstrate tissue-level depletion (an invasive measure such as a tissue biopsy is required to assess this stage).

A very recent report indicates that in individuals with mild iron deficiency, the laboratory tests discussed above do not strictly conform to the four-stage pattern (Dallman, Refino, and Yland, 1982). That report helps to illuminate the results of this evaluation. For example, the otherwise seemingly anomalous finding of normal serum ferritin levels in conjunction with mild anemia or an elevated TIBC accompanied by decreased, but not yet exhausted, iron stores. In addition, there is considerable overlap between normal and iron-deficient populations in terms of at least four of the biochemical indicators: hemoglobin, free erythrocyte protoporphyrin, transferrin saturation, and serum ferritin. As a consequence, even the comprehensive battery of iron status measures used in the present assessment, interpreted with reference to carefully selected, well-accepted standards cannot perfectly define the normal and at-risk groups. The measures selected, however, are the best that are currently available to investigate iron status. They provide the means to investigate three of the four stages in

Exhibit 7-4

Stages of Iron Deficiency

Stage	Indicators
Reduced stores	Reduced iron stores
	• decreased liver iron (hemosiderin)
	• decreased serum ferritin
	No noticeable change in serum iron or total iron binding capacity
Impaired iron transport	More severe reduction in iron stores
	Serum iron levels generally decreased
	Increased total iron binding capacity (TIBC)
	Decreased transferrin saturation (TS)
	Normal hemoglobin levels
Decreased production of iron-containing compounds	Iron stores more severely compromised
	Circulating iron levels decreased
	• lower hemoglobin levels
	• lower hematocrit levels
	• higher free erythrocyte protoporphyrin (FEP)
Tissue depletion	Tissue iron levels decreased
	• tissue biopsy needed

iron deficiency and offer a unique opportunity to construct a detailed picture of the iron status of a large number of low-income children.

Cholesterol. This substance is found in cells throughout the body and has an, as yet, incompletely defined role in the development of heart disease. The present assessment offers an invaluable opportunity to examine serum cholesterol levels in young children; to consider the relationship between serum cholesterol levels and dietary cholesterol intake; and to investigate the effect Head Start participation has on these levels.

Vitamin C. Levels of ascorbic acid were also measured for all children in the Maricopa County sample. Vitamin C serves many important functions in the body and is essential for proper wound healing and normal metabolism. Reduced plasma ascorbic acid levels have been found in a significant number of people, especially among low-income groups. Serum vitamin C levels vary considerably among people and to a large extent are indicators of immediate prior intake, rather than long-term status.

Vitamin A. The children's status on vitamin A was assessed through the use of two indicators in two sites: Greene and Humphreys Counties and Maricopa County. One measure, B-carotene, reflects recent intakes of foods (such as dark green and yellow vegetables) containing the vitamin A precursor carotene and thus serves as a way of verifying reported intake. A second measure serum retinol, or serum vitamin A, is an indicator of long-term vitamin A intake and remains stable in spite of short-term dietary inadequacies. Serum vitamin A levels begin to fall only when stores are close to exhaustion; this occurs only when there is a severe dietary inadequacy or long-term severe illness. Thus, the Head Start Health Evaluation provides the opportunity to examine the effect of Head Start participation on vitamin A status in terms of recent impact (B-carotene levels) and long-term effect (retinol or vitamin A). This dual opportunity is valuable because, although it is unlikely that one year of Head Start participation will affect vitamin A stores in most children, it is very possible that participation has a beneficial short-term effect in the form of increased dietary intake, and that, if sufficient time were to elapse, there might also be a measurable positive long-term effect.

These biochemical measures were used to address the following research questions:

- What is the health/nutritional profile of Head Start and comparison group children in terms of:
  - -- iron status?
  - -- serum cholesterol levels?
  - -- vitamin C and vitamin A concentrations?
- What is the prevalence of problems in these areas?
- Do Head Start children receive hematocrit and/or hemoglobin screening through Head Start?
- Do participants receive nutritional assessments in Head Start?
- What are the impacts of Head Start participation on the health/nutritional status of children?

Analysis of Biochemical Data

Subsequent to the data collection, all hematology samples were shipped to the University of Nebraska Medical Center for assays. From these assays Abt Associates received results for 816 children who participated in the posttest across the four sites. To be consistent with reference standards which could be used for interpreting test results, the analyses of the posttest data focused on children 2 to 5 years of age--that is, those who had had their second birthday but had not had their sixth birthday. Since the age range of the 816 subjects was 1.8 years to 6.6 years, limiting the age range resulted in setting aside a total of 14 cases: two under the age of two and 12 over the age of six years. In addition, because there is considerable interest in racial or ethnic differences in iron status (in particular) and in overall health in general, data are presented by the three principal ethnic groups (white, black, and Hispanic) for many of the analyses. Therefore, data for the children who did not belong to one of these three groups were also set aside. Children in this group included six American Indians or Alaskans, two children classified as other Asian or Pacific Islanders, and 12 additional cases whose ethnicity was indicated only as "other". In sum, all analyses focused on data for 2 to 5 year olds belonging to the three principal race groups comprising the sample--white, black, and Hispanic.

The data for each biochemical indicator were examined within site to determine whether any anomalous values should be set aside before analysis.

(Because they deviate substantially from the rest of the data, such observations would have undue impact on the results.) The exploratory rule of thumb described in Technical Appendix 2B provided an indication of whether any data values were so distant from the bulk of the data that they were "outliers," unlikely to have come from a homogeneous population. Subsequently, each of the individual cases that contained apparent outliers was examined to see whether the value should be retained in light of the results of other related biochemical tests. For example, in St. Clair County, if a hemoglobin reading of 8.9 gm/dl or less was an apparent outlier, then the other iron status indicators for any child with such a hemoglobin value were examined to determine whether this low hemoglobin was reasonable in light of these other measures (such as hematocrit and FEP). If there was a conflict between the initial objective determination and the subsequent substantive review, consideration was given to the possible undue weight such an outlier might have analytically if retained versus the need to reflect the status of the population as accurately as possible. Values (see Table 7-1) determined to be outliers were set aside by changing their sign to recode them as missing values, but they were not removed from the data file.* (In this way, the outlier values could be recalled when needed--for example, for use in runs to determine prevalence rates and for further investigation of this unusual group.)

Data for samples A, B, and C at posttest (as defined in Chapter Two) were examined for evidence of sample differences. There were no sample differences on any biochemical indicator comparing Samples A, B, and C across all sites. However, within site, five instances of sample differences occurred in two sites (Greene and Humphries Counties and St. Clair County) as shown in Table 7-2. Since these minor differences among samples only occurred once on each of five biochemical measures, no adjustments for sample differences were made in the biochemical analyses.

The distribution of the biochemical data was also examined for differences among various groups of children across and within sites.

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*Children with outlier values on a particular value were not included in the estimates of group means for that value. Moreover, the statistical comparisons of these means are unadjusted for group differences which may be related to the biochemical indicators.

Tables 7-3 through 7-17 present detailed information of each biochemical indicator for the following groups of children*:

- Head Start vs. Non-Head Start
  - --All children
  - --Two to four year olds
  - --Males
  - --Females
  - --Whites, Blacks, Hispanics
- Two to Four Year Olds vs. Four to Six Year Olds
  - --All children
  - --Whites, Blacks, Hispanics
- Males vs. Females
  - --All children
  - --Two to four year olds
  - --Four to six years olds
  - --Whites, Blacks, Hispanics.
- Whites vs. Blacks
- Whites vs. Hispanics
- Blacks vs. Hispanics

In addition to analyses for group differences on the biochemical indicators, several analyses** focused on determining the prevalence of children who exceeded the cutoff or reference standards presented in Exhibit 7-3.

The assessment of prevalence of iron status problems was extended as follows. Although the assessment of iron status on the basis of an individual indicator--generally hemoglobin or hematocrit--is the usual clinical approach and is a very practical, useful one, the use of a single indicator may not produce as accurate a profile of the iron status of a population as desirable. For example, hemoglobin concentration lacks both specificity and sensitivity: a low level may be caused by conditions other than iron lack and there is a wide range of values observed in normal subjects (Cook and Finch, 1979). Free erythrocyte protoporphyrin and transferrin saturation are generally considered to provide relatively comparable and valuable information about an individual's iron status. As is the case with hemoglobin levels, however, each has its own shortcomings as a diagnostic tool. That is, FEP increases not only when there is inadequate iron available for hemoglobin synthesis, but also when increased lead has been taken into the body. Transferrin saturation falls when there is an iron lack, and also during a relatively mild or short-term infection. Serum ferritin--a more specific measure of iron status than hemoglobin, FEP and transferrin saturation--may be used to distinguish between anemia resulting from inadequate iron and anemia caused by chronic infection. Its concentration falls in iron deficiency and rises during chronic infection--unlike transferrin saturation, which falls, and FEP, which rises, in both situations.

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*Table 7-1 in the Appendix presents the list of outlier values for each biochemical indicator (by Head Start/non-Head Start and race). Although these values were removed from analyses comparing groups, the absence of these values did not change the incidence of significant findings. That is, no additional Head Start effects were present when the data were analyzed with the outlier values present.

**Children with outlier values were included in the prevalence estimates.

By using these four measures in combination according to the models shown below, it is possible to improve the sensitivity and specificity of the measurement battery in detecting anemia. That is, one cannot only estimate the occurrence of poor iron status based on hemoglobin values alone, but also exclude other causes of anemia (such as chronic infection). In this study, Head Start and non-Head Start children were defined sequentially as anemic or not anemic on the basis of the following four steps:

- Hemoglobin < 11.0 gm/dl.
- Hemoglobin < 11.0 gm/dl. and FEP > 49.0 mcg/dl.
- Hemoglobin < 11.0 gm/dl. and FEP > 49.0 mcg/dl. and Ferritin < 12.0 ng/ml
- Hemoglobin < 11.0 gm/dl. and FEP > 49.0 mcg/dl. and Ferritin < 12.0 ng/ml. and Transferrin Saturation < 16.0%

Because there is evidence of a consistent racial difference in hemoglobin levels--black children appear to have normal values 0.5 to 1.0 gm/dl. lower than normal values for white children--a second sequence of analysis used a relaxed hemoglobin standard of < 10.5 gm/dl. The relaxed standard was used for all ethnic groups (not black children only) to demonstrate the effect such a reduction has on the percentage of children found to be anemic.

Selection of covariates to be included in a regression model common to the across sites and within sites analyses focused on three general areas of information: demographic/economic status, dietary intake, and participation in programs which might affect iron status in particular and nutritional status in general. Those significantly related to three or more biochemical values and used in the final regression model as covariates are:

- site (in across site model);
- child's race,
- child's gender,
- mother's education, and
- and per capita income percentile.

Site and race are especially important covariates; both entered into the regression equation for five of the twelve biochemical indicators, and site entered alone for five additional indicators. Each of the three additional variables proved to be far weaker predictors than either site or race but were included in the common model for all variables, rather than selectively. In addition, in some instances a dietary intake variable (for example, vitamin C intake) proved to be strongly associated with an individual biochemical indicator (for example, plasma vitamin C concentration) in a particular site. These variables were not included in the final covariate model, but results of analyses incorporating them for appropriate biochemical indicators are discussed below.

Regression analysis was also carried out on longitudinal data using, in addition to the five covariates listed above, the pretest value for the indicator. For example, hemoglobin concentration at pretest was entered along with the five previously mentioned covariates in regression analysis of hemoglobin values at posttest for cases in the longitudinal file.

Summary of Findings

Prevalence of Abnormal Findings on Biochemical Indicators at Pretest

Exhibit 7-5 presents the prevalence of abnormal values for the biochemical indicators of the children at pretest. (Comparable information on the posttested children is shown on Table 7-18.) The prevalence of anemia, as defined on the basis of hemoglobin concentration only, ranged from 0 percent in Maricopa County to 18.3 percent in St. Clair County. The proportion of children with below standard hematocrit levels also varied considerably by site from 4.1 percent in Mingo County to 14.3 percent in Greene and Humphreys Counties. More children had unacceptable readings for transferrin saturation than for any of the other iron status measures: 11.4 percent in Maricopa County to 31.8 percent in St. Clair County. It should be noted, however, that it is generally recommended that transferrin saturation not be used as the only test of iron status (Exhibit 7-2). Essentially, no children had low serum ferritin levels, measures generally agreed to reflect iron stores in the body. Vitamin A levels were below standard in only a very few cases, but B-carotene concentrations were low in 29.2 to 61.0 percent of children in the four sites at pretest.

Because it is clear that "no single iron parameter monitors the entire spectrum of iron status," (Cook, 1979) a sequential approach was used to define the iron status of children. Using various definitions of anemia, as shown in Exhibit 7-6, very few pretested children (n=2) were found to have anemia, especially according to the more restrictive definitions including abnormal ferritin and transferrin saturation values. Moreover, lowering the hemoglobin cutoff value to 10.5 gm/dl. to reduce the number of potential false positives, especially among black children, further reduces the numbers of children found to have anemia according to the various definitions. (Table 7-19 presents similar information on the posttested children.)

Exhibit 7-7 presents the same data as Exhibit 7-5 showing how the abnormal values vary by ethnic group among the pretested children. In general, a greater proportion of black children had abnormal iron status levels on hematocrit, hemoglobin* and FEP's. The abnormal cholesterol levels

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*The apparent racial difference in hemoglobin levels is in agreement with those reported by Garn et al. (1980).

Exhibit 7-5

Percentage of Children With Abnormal Levels on Biochemical Indicators at Pretest (Samples A & D) by Site

Biochemical Indicator		Pretested Children (Samples A & D) in:				
		Greene & Humphreys Counties n=93	St. Clair County n=115	Maricopa County n=90	Mingo County n=73	All Sites n=371
Hematocrit	n	14/ 91	12/110	8/110	3/ 73	37/363
< 34.0%	%	15.4	10.9	7.3	4.1	10.2
Hemoglobin	n	5/ 92	20/109	0/ 90	3/ 69	28/360
< 11.0 (gm/dl.)	%	5.4	18.3	0.0	4.3	7.8
FEP	n	2/ 85	15/107	0/ 89	8/ 68	17/349
> 49 mcg/dl.	%	2.3	14.0	0.0	0.0	4.9
TIBC	n	2/ 86	11/ 88	3/ 89	9/ 60	27/323
> 400 mcg/dl.	%	2.3	12.5	3.4	15.0	8.4
Serum iron	n	4/ 86	8/ 91	4/ 87	5/ 66	21/330
< 40.0 mcg/dl.	%	4.6	8.8	4.6	7.6	8.4
TS	n	10/ 86	28/ 88	10/ 88	12/ 59	60/321
< 16.0%	%	11.6	31.8	11.4	20.3	18.7
Ferritin	n	0/ 89	2/105	0/ 88	0/ 70	2/352
< 10.0 ng/ml.	%	0.0	1.9	0.0	0.0	0.6
Cholesterol	n	18/ 87	17/ 98	12/ 87	7/ 67	54/339
> 200 mg/dl.	%	20.7	17.3	13.8	10.4	15.9
MCHC	n	0/ 91	3/109	0/ 89	2/ 69	5/679
< 30.0%	%	0.0	2.8	0.0	2.9	0.7
Vitamin A	n	2/ 82	0/ 88	1/ 85	0/ 59	3/314
< 20.0 mcg/dl.	%	2.4	0.0	1.2	0.0	0.9
B-carotene	n	34/ 85	26/ 89	36/ 88	36/ 59	132/321
< 70.0 mcg/dl.	%	38.2	29.2	40.9	61.0	41.1

Exhibit 7-6

Percentage of Children Considered Anemic by Four Sequential Definitions of Anemia at Pretest by Site

Definition of Anemia		Pretested Children (Samples A & D) in:			
		Greene & Humphreys Counties n=93	St. Clair County n=115	Maricopa County n=90	Mingo County n=73
Hemoglobin < 11.0	n	5/ 91	20/109	0	5/ 72
	%	5.5	18.3	0.0	7.0
Hemoglobin < 11.0 + FEP > 49.0	n	1/ 91	5/109	0	3/ 72
	%	1.1	4.6	0.0	4.2
Hemoglobin < 11.0 + FEP > 49.0 + Ferritin < 12.0	n	0	2/109	0	0
	%	0.0	1.8	0.0	0.0
Hemoglobin < 11.0 + FEP > 49.0 + Ferritin < 12.0 + TS < 16.0	n	0	2/109	0	0
	%	0.0	1.8	0.0	0.0
Hemoglobin < 10.5	n	2/ 91	6/109	0	3/ 72
	%	2.2	5.5	0.0	4.2
Hemoglobin < 10.5 + FEP > 49.0	n	1/ 91	2/109	0	3/ 72
	%	1.1	1.8	0.0	4.2
Hemoglobin < 10.5 + FEP > 49.0 + Ferritin < 12.0	n	0	1/109	0	0
	%	0.0	1.0	0.0	0.0
Hemoglobin < 10.5 + FEP > 49.0 + Ferritin < 12.0 + TS < 16.0	n	0	1/109	0	0
	%	0.0	1.0	0.0	0.0

Exhibit 7-7

Percentage of Children With Abnormal Levels on Biochemical Indicators at Pretest (Samples A and D) by Site and Race

Biochemical Indicator		Pretested children (Samples A & D) in:									
		Greene & Humphreys Counties		St. Clair County	Maricopa County			Mingo County	All Sites		
		White n=7	Black n=86	Black n=115	White n=18	Black n=3	Hispanic n=69	White n=73	White n=98	Black n=204	Hispanic n=69
Hematocrit	n	2/ 7	12/ 84	12/110	3/ 18	1/ 3	4/ 68	3/ 73	8/ 98	25/197	4/ 68
< 34.0%	%	28.6	14.3	10.9	16.7	33.3	5.9	4.1	8.2	12.7	5.9
Hemoglobin	n	0/ 7	5/ 85	20/109	0/ 18	0/ 3	0/ 69	3/ 69	3/ 94	25/197	0/ 69
< 11.0 gm/dl.	%	0.0	5.9	18.3	0.0	0.0	0.0	4.3	3.2	12.7	0.0
FEP	n	0/ 7	2/ 78	15/107	0/ 18	0/ 3	0/ 68	0/ 68	0/ 93	17/188	0/ 68
> 49 mcg/dl.	%	0.0	2.6	14.0	0.0	0.0	0.0	0.0	1.1	4.1	0.0
TIBC	n	0/ 6	2/ 80	11/ 88	0/ 18	0/ 3	3/ 68	9/ 60	9/ 84	13/171	3/ 68
> 400 mcg/dl.	%	0.0	2.5	12.5	0.0	0.0	4.4	15.0	10.7	7.6	4.4
Serum Iron	n	1/ 6	3/ 80	8/ 91	1/ 18	0/ 3	3/ 66	5/ 66	7/ 90	11/174	3/ 66
< 40.0 mcg/dl.	%	16.7	3.8	8.8	5.6	0.0	4.5	7.6	7.8	6.3	4.5
TS	n	1/ 6	9/ 80	28/ 88	2/ 18	0/ 3	8/ 67	12/ 59	15/ 83	37/171	8/ 67
< 16.0%	%	16.7	11.3	31.8	11.1	0.0	11.9	20.3	18.1	21.6	11.9
Ferritin		0/ 7	0/ 82	2/105	0/ 18	0/ 3	0/ 67	0/ 70	0/ 95	2/190	0/ 67
< 10.0 ng/ml.		0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Cholesterol		1/ 7	17/ 80	17/ 98	2/ 18	0/ 2	10/ 67	7/ 67	10/ 92	34/180	10/ 67
> 200 mg/dl.		14.3	21.3	17.3	11.1	0.0	14.9	10.4	10.9	18.9	14.9
Vitamin A		0/ 6	2/ 76	0/ 88	1/ 17	0/ 2	0/ 66	0/ 59	1/ 82	2/166	0/ 66
< 20.0 mcg/dl.		0.0	2.6	0.0	5.9	0.0	0.0	0.0	1.2	1.2	0.0
B-carotene		3/ 6	31/ 79	26/ 89	10/ 18	0/ 2	26/ 68	36/ 59	49/ 83	57/170	26/ 68
< 70.0 mcg/dl.		50.0	39.2	29.2	55.6	0.0	38.2	61.0	59.0	33.5	38.2

were more frequent among black (18%) and Hispanic (15%) than white children (11%). The abnormally low B-carotene values were found most frequently among white children (59%). (The abnormal values for each ethnic group at the posttest are shown in Table 7-20.)

The actual levels of the biochemical indicators, in terms of means and standard deviations for the various groups of children, are presented in Tables 7-21 and 7-22 for pretest data and Tables 7-23 through 7-25 for posttest data. Mean values for all measures were well within acceptable ranges with the exception of mean pretest B-carotene concentration in Mingo County, which was slightly below the 70 mcg/dl. value selected as the lower limit of acceptable. At posttest Head Start participants had significantly higher average B-carotene levels than did non-Head Start children. Average vitamin C concentrations at posttest were also significantly higher for Head Start participants than non-participants in Maricopa County (the one site where vitamin C status was assessed.) Both of these measures reflect recent or short-term intake (as opposed to long-term consumption or stores) and may be one indicator of Head Start effect on the nutritional status of participants. It is possible, however, that other sources of intake (for example, vitamin C supplements taken at home) are key determinants of these differences. Within each of the four sites, there were no other significant differences between the two groups of children.

Tables 7-22, 7-24 and 7-25 present data across sites and within sites by ethnic group. Across sites, there were highly significant differences among the ethnic groups for the iron status measures, but all mean values were well within acceptable ranges. Across sites, mean hemoglobin concentration for black children was 0.6 gm/dl. lower than that for white children; this difference has been noted frequently in the literature but there is no satisfactory explanation for its existence (Garn, 1980 and 1981; Williams, 1981).

Serum ferritin concentrations were noticeably higher in black children than in Hispanic or white children. This was especially interesting in light of apparent racial differences in hemoglobin concentrations, but in the opposite direction. This could be interpreted to mean that although iron stores (as indicated by serum ferritin levels) were higher in blacks than in whites or Hispanic children, utilization of hemoglobin production was lower in blacks than in either of the other two groups.

Indicators of Vitamin A status did not show large differences among ethnic groups: whites had slightly higher serum Vitamin A levels and considerably lower B-carotene values than black or Hispanic children. The latter did not appear to have poor vitamin A status, as was observed in the Ten-State Nutrition Survey (USDHEW, 1972).

Exhibit 7-8 presents a comparison of the percentages of children with unacceptable levels on the biochemical indicators in the Head Start Health Evaluation with those of three other assessments of the health status of preschool children: the Preschool Nutrition Survey, the Ten-State Nutrition Survey, and the First National Health and Nutrition Examination Survey. These three studies conducted at least 10 years prior to the Head Start Health Evaluation provide the most complete and comparable data available, but they may not reflect accurately the health status of young children in 1981, the year of the Head Start study. Results, soon to be available from the Second National Health and Nutrition Examination Survey (conducted in the late 1970's) will provide more contemporaneous reference data.

The percent of children in the Head Start Health Evaluation whose status is considered abnormal on the basis of three of the iron status measures--hematocrit, serum iron, and transferrin saturation--is similar to the three earlier studies. In terms of the two other iron status measures for which comparison data are available, however, the results are markedly different. A much smaller percentage of Head Start Health Evaluation participants had low hemoglobin levels than did children in the previous studies. The same is true for TIBC results. Fewer Head Start Health Evaluation subjects also had unacceptable vitamin A status, in terms of both vitamin A and B-carotene concentrations, than did children in the Ten-State Nutrition Survey and the First National Health and Nutrition Examination Survey. Finally, comparison with the limited serum cholesterol data available indicates that across races there was a much higher prevalence of unacceptably high levels among Head Start-eligible children in 1981 than in children evaluated in the Preschool Nutrition Survey. In the present evaluation, this higher prevalence is limited to black and Hispanic children.

Health Services Provided by Head Start

The health services mandated by the Head Start Performance Standards which may be related to the biochemical indicators are hematological screen-

Exhibit 7-8

Percentage of Children With Unacceptable Levels on Biochemical Indicators in Four Surveys

Biochemical Indicator	Head Start Health Evaluation (at pretest)	Head Start Health Evaluation (at posttest)		Preschool Nutrition Survey	Ten State Nutrition Survey (low income ratio states)	First National Health and Nutrition Examination Survey			
	2-6 yr. olds at pretest	2-6 yr. olds		2-6 yr olds	2-5 yr olds	2-3 yr olds		4-5 yr olds	
		HS	NHS			Male	Female	Male	Female
Hematocrit <34.0%	9.8	10.4	10.4	10.0[a]	—	—	—	—	—
Whites	7.1	4.0	3.7	—	11.8	5.0	9.0	3.0	3.0
Blacks	12.7	16.5	17.7	—	29.1	11.0	10.0	6.0	6.0
Hispanics	5.6	4.7	4.3	—	14.1	—	—	—	—
Hemoglobin <11.0 gm/dl.	7.4	1.4	1.8	8.0[a]	—	—	—	—	—
Whites	5.2	0	3.0	—	13.1	7.0	7.0	1.0	2.0
Blacks	10.7	2.3	1.3	—	34.0	19.0	15.0	6.0	3.0
Hispanics	0	1.6	0	—	9.5	—	—	—	—
Serum Iron <40.0 mcg/dl.	6.2	10.5	9.9	—	5.5	—	—	—	—
Whites	7.8	12.2	8.8	—	(Approx.)	8.0	6.0	8.0	6.0
Blacks	6.3	10.0	11.3	—		9.0	13.0	17.0	13.0
Hispanics	4.3	8.1	8.7	—		—	—	—	—
Transferrin Saturation <16.0%	18.1	24.7	21.4	—	21.0[d]	—	—	—	—
Whites	17.6	27.1	19.8	—	—	27.0	21.0	22.0	17.0
Blacks	21.5	24.9	23.4	—	—	24.0	44.0	27.0	23.0
Hispanics		19.4	19.6	—	—	—	—	—	—
Total Iron Binding Capacity >400 mcg/dl.	8.8	7.2	6.9	—	—	—	—	—	—
Whites	10.6	6.6	4.1	—	—	30.0	36.0	30.0	24.0
Blacks	8.7	5.8	5.0	—	—	47.0	49.0	28.0	14.0
Hispanics	2.9	11.9	19.6	—	—	—	—	—	—
Cholesterol mg/dl. >200	—	12.2	10.9	4.0[b]	—	—	—	—	—
Whites	10.8	6.2	7.0	—	—	—	—	—	—
Blacks	21.1	16.2	14.3	—	—	—	—	—	—
Hispanics	16.2	12.9	10.9	—	—	—	—	—	—
>204	—	—	—	6.5[c]	—	—	—	—	—
Whites	7.5	5.0	5.0	—	—	—	—	—	—
Blacks	20.0	15.0	12.0	—	—	—	—	—	—
Hispanics	13.2		11.0	—	—	—	—	—	—
Vitamin A <20 mcg/dl.	0.9	0.6	0.9	—	—	—	—	—	—
Whites	1.2	0	0	—	11.3	3.4[e]			
Blacks	1.2	0	2.0	—	21.3	13.2[e]			
Hispanics	0	1.7	0	—	51.7	—			
B-Carotene mcg/dl. <70	41.0	14.0	23.9	—	—	—			
Whites < 60	58.3	—	—	—	33.7	—			
Blacks < 60	33.1	—	—	—	23.9	—			
Hispanics < 60	37.1	—	—	—	33.4	—			

[a] Data reported are on lowest income group.

[b] 12-36 months

[c] 37-71 months

[d] Transferrin Saturation <20%: If hemoglobin <10.0 gm/dl., 63.6%; if hemoglobin >10.0 gm/dl., 21.7%.

[e] Data reported are for 1-5 year olds, with sexes combined.

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ings (using a hematocrit and/or hemoglobin level) and the nutrition program of meals and snacks. While it is reasonable to assume that all children present in Head Start on a particular day receive the nutrition program, according to Head Start health records, not all children receive the hematology screens or nutrition assessments.

Exhibit 7-9 shows an average 67 percent of the Head Start children receive a hematocrit and/or hematology screen. There is considerable variation among the sites in both the timing and receipt of these screens, however. In St. Clair County 68 percent of the children received a hematological screen and this was the only site in which an appreciable number of children received a hematocrit or hemoglobin screen prior to entry into Head Start. Here the Head Start program requires the children to have a physical examination prior to applying for Head Start. As a follow-up to this exam, Head Start runs a summer screening clinic during which the hematocrit and/or hemoglobin screen is administered if a child has not had the necessary blood tests during his or her physical exam.

In the remaining three sites, the hematological screen was conducted after entry into the program, usually in conjunction with the physical

Exhibit 7-9

Percentage of Head Start Children Receiving Hematological Screens and Nutrition Assessments through Head Start by Site

Head Start Screen/ Assessment		Posttested Head Start Children (Samples A, B, C) in:				
		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=102	Mingo County[a] n=112	All Sites n=449
Hematological Screen	n	48	73	101	78	300
	%	37.8	67.6	99.0	69.6	66.8
Nutrition Assessment	n	52	46	98	8	204
	%	40.9	42.6	96.1	7.1	45.4

[a] Includes 20 children with no health record in Mingo County

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examination. The rates of screening range from 38 percent in Greene and Humphreys Counties to 70 percent in Mingo County* and 99 percent in Maricopa County. In all sites, it seems that Head Start is responsible, in large part, for the hematogical screening conducted. Data on nutritional assessments conducted by Head Start are also presented in Exhibit 7-9. Across sites, 45 percent of the Head Start children received nutritional assessments. Only in Maricopa County, where Head Start employed a full-time nutritionist on the staff did a substantial proportion (96%) of the children receive nutrition assessments.

The exact causal relationship between the Head Start services and the status of the children at posttest is difficult to assess given the lack of necessary detail in the health records. There, however, do appear to be some significant relationships between the receipt of health services and hematological status at posttest.

Because Head Start tends to perform the hematological assessments using either a hematocrit or a hemoglobin, the combination of these two measures provides assessment information on all of the children. The relationship between the combined hematological measure and the presence of abnormal hematocrit or hemoglobin at posttest indicates that children receiving a hematocrit or hemoglobin screen are less likely to have abnormal values at posttest as shown in Exhibit 7-10.** There is no similar relationship between a nutrition assessment and the hematological status at posttest.

Impact of Head Start on Biochemical Indicators of Children

The impact of the Head Start program on the biochemical indicators of the children was investigated on both the longitudinal sample (Sample A) and on all of the posttested children (Samples A, B, C) using regression models. In the longitudinal analysis, the pretest level for a given biochemical indicator was by far the strongest predictor of the level observed at posttest for that indicator. In the longitudinal analysis there were no signi-

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*85 percent of the children with health records received a hematology screen. The rates for the 20 children with missing records are unknown.

**This relationship is primarily due to the relationship between the hematocrit screen and abnormal hematocrit values since there are only six abnormal hemoglobin values. See Table 7-26 for detail.

Exhibit 7-10

Percentage of Head Start Children with Abnormal Levels on Hematocrit or Hemoglobin at Posttest by Receipt of Various Related Health Screens

Health Related Screens Delivered to Head Start Children		Posttested Head Start Children (Samples A, B, C) in:									
		Greene & Humphreys		St. Clair		Maricopa		Mingo		All Sites	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Hematocrit or Hemoglobin Screen by Head Start	N	48	79	73	35	101	1[a]	78	34	300	149
	n	5/ 48	17/ 77	9/ 71	6/ 34	5/100	1/ 1	2/ 78	2/ 34	21/297	26/146
	%	10.4	22.1	12.7	17.6	5.0	100.0	2.6	5.9	7.1	17.8
	X^2	p = 0.10		p = 0.50		p = 0.001		p = 0.38		p = 0.001	
Nutritional Assessment by Head Start	N	52	75	46	62	98	4[a]	8	104	204	245
	n	6/ 52	16/ 73	6/ 45	9/ 60	4/ 97	2/ 4	0/ 8	4/104	16/202	31/341
	%	11.5	21.9	13.3	15.0	4.1	50.0	0.0	3.8	7.9	12.9
	X^2	p = 0.13		p = 0.81		p = 0.001		p = 0.57		p = 0.09	

[a] X^2 significance is due to unbalanced distribution.

ficant Head Start effects found on any of the biochemical measures either across all sites or within site. There were significant effects on B-carotene within and across sites, however. (These effects are discussed below with the means for the adjusted biochemical indicators.) The regression results are shown in Tables 7-27 through 7-40 for the longitudinal sample and Tables 7-41 through 7-56 for the entire posttest sample.

Exhibit 7-11 displays the average biochemical values adjusted for the covariates included in the regression analyses (race, gender, mother's education, income percentile, site, and Head Start status). It is interesting to note that average hemoglobin concentrations and average ferritin levels in the two sites in which essentially all children are black (Greene & Humphreys Counties and St. Clair County) are not different from those in the other two sites. Examination by race across sites, as in Exhibit 7-12, reveals differences in these two measures among groups: black children across sites have the lowest mean hemoglobin concentration and the highest mean serum ferritin levels. Mean hemoglobin concentration for Hispanic children is as high as that for white children, but mean ferritin levels are the lowest. On a within-site basis, this pattern is repeated in Maricopa County, the only site in which all three ethnic groups were evaluated. Greene and Humphreys Counties display the same white/black difference for mean hemoglobin and, to a lesser extent, for mean ferritin levels. In Mingo County no difference is seen in mean hemoglobin concentrations, but the mean ferritin levels are much higher in black children than in whites. No comparisons are possible within St. Clair County, but the mean hemoglobin concentration for black children is comparable to that for black children in two of the other sites. Mean ferritin levels are also comparable to those for black children in the other three sites.

Adjusted mean carotene levels were significantly higher in Head Start children both across and within the two sites where carotene levels were measured. This effect was not evident for vitamin A levels, however, thus, one year of Head Start participation had a positive effect on short-term vitamin A intake (as evidence by the higher carotene levels) but no on long-term status (as reflected by vitamin A levels). As mentioned earlier, this is not surprising, because the intervention period was relatively brief. There were no other significant differences between Head Start and non-Head Start children for the other biochemical indicators.

Exhibit 7-11

Means Within Site for Biochemical Indicators (Adjusted for Covariates) for Children in Samples A, B, and C by Head Start Status[a]

Biochemical Indicator		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=111	NHS n=92	HS n=94	NHS n=70	HS n=93	NHS n=57	HS n=111	NHS n=102	HS n=408	NHS n=321
Hematocrit (%)	n	111	92	93	70	93	57	111	102	408	321
		35.5	36.0	35.6	35.3	36.5	36.5	37.7	38.1	36.4	36.4
Hemoglobin (gm/dl.)	n	110	92	94	69	92	56	109	100	405	317
		12.6	12.8	12.6	12.6	13.1	13.0	13.2	13.2	12.9	12.9
FEP (mcg/dl.)	n	109	92	94	66	93	57	107	98	403	313
		19.1	19.0	21.4	22.5	23.3	23.2	16.0	17.3	19.7	20.2
TIBC (mcg/dl.)	n	93	76	84	61	83	57	101	89	361	283
		332	332	323	319	339	337	315	319	326	326
Iron (mcg/dl.)	n	100	80	83	63	88	57	99	92	370	292
		63.6	68.6	74.4	68.2	78.0	85.3	67.0	69.4	70.0	72.5
TS (%(	n	91	76	79	61	85	56	95	89	350	282
		18.9	20.6	22.7	21.7	22.7	25.3	21.2	21.7	21.2	22.2
MCHC (%) (%)	n	110	92	92	40	91	55	107	98	400	315
		35.6	35.6	35.3	35.5	35.8	35.7	35.0	34.7	35.4	35.4
Ferritin (ng/ml.)	n	88	73	83	63	82	51	99	86	352	273
		24.0	27.1	30.3	28.0	21.0	19.4	23.1	20.8	24.5	23.9
Cholesterol (mg/dl.)	n	101	82	93	69	89	57	108	97	391	305
		167	171	168	169	162	159	157	154	163	163
Vitamin A (mcg/dl.)	n	60	57			83	55			143	112
		36.9	37.7	b	b	36.1	36.6	b	b	36.5	37.1
Carotene (mcg/dl.)	n	60	56			83	56			144	115
		104.6	90.2***	b	b	100.5	89.1**	b	b	102.2	89.6***
Vitamin C (mg/dl.)	n					67	38			67	38
		b	b	b	b	1.5	1.3	b	b	1.5	1.3

[a] Significance testing assesses deviation from the total population (grand) mean and is indicated as:

* p < .05
** p ≤ .01
*** p ≤ .001

[b] Not available because assays not performed.

Exhibit 7-12

Means by Race for Biochemical Indicators (Adjusted for Covariates) for Children at Posttest (Samples A, B, C)[a]

Biochemical Indicator		By Site								Across Sites		
		Greene & Humphreys Counties		St. Clair County	Maricopa County			Mingo County		All Sites		
		White n=32	Black n=171	Black n=163	White n=37	Black n=8	Hispanic n=105	White n=205	Black n=12	White n=274	Black n=351	Hispanic n=105
Hematocrit	n	32	171	162	37	8	105	201	12			
(%)		36.4	35.6	35.4	36.8	37.6	36.3	37.9	37.3	36.8	36.2	36.4
Hemoglobin	n	32	170	162	37	8	103	197	12			
(gm/dl.)		13.1	12.6*	12.6	13.1	12.5*	13.0	13.2	13.1	13.1	12.7***	13.1
FEP	n	31	170	139	37	8	105	193	12			
(mcg/dl.)		18.7	19.0	21.9	20.6	19.6	24.6*	16.4	20.3	18.7*	20.1	22.2**
TIBC	n	26	143	144	34	7	99	178	12			
(mcg/dl.)		334	333	321	323	318	345*	317	314	324	323	347
Iron	n	29	151	145	37	8	100	181	10			
(mcg/dl.)		69.6	65.0	71.9	75.7	88.1	82.2	68.9	55.6	71.5	69.5	75.2
TS	n	28	139	139	33	7	101	173	11			
(%)		21.5	19.2	22.4	21.4	26.2	24.3	21.5	20.6	21.5	21.2	23.6
MCHC	n	32	170	161	36	7	103	194	11			
(%)		36.1	35.5	35.4	35.6	33.6*	36.0***	34.8	35.3	35.5	35.0**	36.1*
Ferritin	n	26	135	145	31	7	95	173	12			
(ng/ml.)		23.8	25.1	29.3	22.8	30.1*	18.9**	21.4**	31.8	22.6	27.4***	18.4***
Cholesterol	n	30	153	161	36	8	102	193	12			
(mg/dl.)		173	168	169	154*	182*	162	156	156	162	164	164
Vitamin A	n	22	95		33	6	99					
(mcg/dl.)		35.5	37.7	b	37.4	34.6	36.1	b	b	37.1	37.2	36.2
Carotene	n	23	97		34	7	98					
(mcg/dl.)		106.1	95.5	b	80.3**	105.7	100.6	b	b	93.3	89.8	105.9
Vitamin C					28	6	71					
(mg/dl.)	n	b	b	b	1.6	1.3	1.4	b	b	c	c	c

[a] Significance testing assesses deviation from the total population (grand) mean and is indicated as:
* p < .05
** p < .01
*** p < .001

[b] NA: Not Available because assays not performed.

[c] Not Available because assay performed in Maricopa County only

Dietary intake variables were examined for inclusion as covariates in the final regression model. Although these variables were not included in that model, two of them were significantly related to the appropriate biochemical measure: total vitamin C intake to serum vitamin C levels ($p \leq 0.001$), and total vitamin A intake to serum vitamin A ($p \leq 0.0001$) and carotene ($p \leq 0.001$) concentrations. This significant relationship also existed between total daily intake of these two vitamins from foods and vitamin supplements and the respective biochemical indicator. This finding is not surprising in light of the fact that serum vitamin C and carotene concentrations are indicators of recent intake. It is, however, important because it is an objective verification of the significantly higher intakes of these two vitamins noted by evaluation nutritionists for Head Start children (see Chapter Six), and it demonstrates that the benefit to Head Start children is not restricted to larger dietary intakes, but is actually reflected in body levels of the two nutrients.

Finally, we examined the relationship between enrollment in medical insurance and Food Stamps or WIC and abnormal hematocrit or hemoglobin levels. Comparisons between the Head Start and non-Head Start group are presented in Exhibit 7-13. Across sites, children in the non-Head Start group who did not have medical insurance were more likely to have abnormal hematocrit or hemoglobin levels. This trend was not consistent in all sites, however. A significant relationship was found between enrollment in Food Stamps or WIC and abnormal hematocrit/hemoglobin readings of children. In all sites except Maricopa County, similar trends were evident for the non-Head Start group, although the differences (both within and across sites) were not statistically significant. Thus, the Food Stamp and WIC programs seem to be targeted to those children most in need of the services.

Conclusions

The extensive laboratory assessment of health status conducted as part of the Head Start Health Evaluation included measures of iron status, vitamin C and vitamin A levels, and serum cholesterol concentrations. Iron status of Head Start children is not significantly different from that of non-Head Start children after one year of program participation. This finding is not surprising in light of the fact that iron status is affected

Exhibit 7-13

Percent of Children with Abnormal Levels on Hematocrit or Hemoglobin at Posttest by Various Health Related Services

Health Related Services		Greene & Humphreys Counties				St. Clair County			
		HS		NHS		HS		NHS	
Medical Insurance		Yes n=72	No n=41	Yes n=52	No n=39	Yes n=87	No n=19	Yes n=59	No n=25
	n	10/ 70	11/ 41	8/ 51	3/ 37	13/ 85	2/ 18	14/ 56	3/ 25
	%	14.3	26.8	15.7	8.1	15.3	11.1	25.0	12.0
	x^2	p = 0.10		p = 0.29		p = 0.65		p = 0.18	
Food Stamps or WIC		Yes n=102	No n=23	Yes n=85	No n=14	Yes n=102	No n=5	Yes n=72	No n=9
	n	20/100	1/ 23	11/ 83	1/ 13	14/ 99	1/ 5	17/ 72	1/ 8
	%	20.0	4.3	13.3	7.7	14.1	20.0	23.9	12.5
	x^2	p = 0.07		p = 0.57		p = 0.72		p = 0.46	

Exhibit 7-13 (continued)

Percent of Children with Abnormal Levels on Hematocrit or Hemoglobin at Posttest by Various Health Related Services

Health Related Services	Maricopa County				Mingo County			
	HS		NHS		HS		NHS	
Medical Insurance	Yes n=29	No n=75	Yes n=13	No n=47	Yes n=70	No n=44	Yes n=61	No n=41
n	3/ 28	3/ 75	1/ 13	2/ 47	1/ 70	3/ 44	2/ 59	2/ 41
%	10.7	4.0	7.7	4.3	1.4	6.8	3.4	4.9
x^2	p = 0.19		p = 0.61		p = 0.13		p = 0.71	
Food Stamps or WIC	Yes n=64	No n=41	Yes n=30	No n=29	Yes n=75	No n=39	Yes n=57	No n=52
n	3/ 64	3/ 40	0/ 30	3/ 29	4/ 73	0/ 39	3/ 56	2/ 50
%	4.7	7.5	0.0	10.3	5.3	0.0	5.4	4.0
x^2	p = 0.55		p = 0.07		p = 0.14		p = 0.74	

Exhibit 7-13 (continued)

Percent of Children with Abnormal Levels on Hematocrit or Hemoglobin at Posttest by Various Health Related Services

Health Related Services		All Sites			
		HS		NHS	
Medical Insurance		Yes n=258	No n=179	Yes n=185	No n=152
	n	27/253	19/178	25/179	10/150
	%	10.7	10.7	14.0	6.7
	x^2	p = 1.00		p = 0.03	
Food Stamps or WIC		Yes n=343	No n=108	Yes n=244	No n=104
	n	41/338	5/107	31/240	7/100
	%	12.1	4.7	12.9	7.0
	x^2	p = 0.03		p = 0.11	

by as yet incompletely understood factors, such as bioavailability of iron consumed, iron supplementation, severe or chronic infection or inflammation, and possibly ethnicity.

Close scrutiny of the iron status of a sub-population of children exhibiting one or more of these factors or others suspected of influencing iron status may contribute to a better understanding of Head Start's role. Hence, Head Start's contribution cannot be well defined until iron metabolism and factors affecting it are themselves more clearly defined and understood.

Head Start participation appears to have had a positive effect on B-carotene concentration, which reflects short-term status or recent consumption of foods containing vitamin A. The significantly higher level of this nutrient in the blood reflects significantly higher intakes of vitamin A by Head Start participants in comparison with non-Head Start children.

In addition, Head Start involvement results in screening for anemia of many children who otherwise would most likely not be assessed. Although few children were found who would be classified as anemic, even fewer low-income children received screens for anemia unless they were attending Head Start. Hence Head Start's contribution to children's health, although required by only a few children, is a valuable service to those who would otherwise not have access to a hematology screening and remediation of their problems with anemia.

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CHAPTER EIGHT

DEVELOPMENTAL EVALUATION

Developmental Ability Indicators

One of the primary goals of the Head Start program is to increase the social competence of participating children, and thus to enhance their ability to develop within their present environment and ultimately to maximize their learning experiences in school. Within the definition of social competence, Head Start "takes into account the interrelatedness of cognitive and intellectual development, physical and mental health, nutritional needs, and other factors that enable a developmental approach to help children achieve [their potential]" (Head Start, 1975). To evaluate the developmental skills of the child, Head Start programs perform developmental assessments.* These assessments examine areas of preschool readiness including physical coordination and development, intellectual development, sensory development with special emphasis on sensory discrimination, emotional development, and social development.

The Head Start Health Evaluation focused primarily on the physical health status of the child. Hence, the evaluation included a more limited developmental assessment, one confined to measures of physical health development and behaviors which could potentially be associated with physical health status.

To this end, the children's fine and gross motor coordination was assessed using these elements:

- a series of gamelike activities specified in the Motor Scale of the McCarthy Scales of Children's Abilities (McCarthy, 1972);
- children's behaviors derived from the evaluator's estimate of the child's willingness to try to perform the McCarthy Motor Scale tasks;

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*Development assessment is part of the mental health component of the Head Start Performance Standards.

- parent's responses about the child's behavior in terms of the frequency with which the child acted in specified ways (e.g., "has a bad temper" or "gives up easily").

The measures from the McCarthy Scales and their descriptions are presented in Exhibit 8-1. The McCarthy Scales of Children's Abilities were selected for the developmental assessment for several reasons. The Motor Scale appeared to provide a reasonable method to assess the developing motor ability of Head Start and non-Head Start children. The standardization sample was large (n=1032) and reflected the 1970 U. S. Census population in terms of race, geographic region, and father's occupation. Moreover, the standardization sample included equal numbers of boys and girls. Although there was no specific prior research regarding the performance of low-income children on the McCarthy scales, prior research (Kaufman and Kaufman, 1973) had shown that, for children aged 2-1/2 to 5-1/2 years old, there were no differences in performance on the McCarthy Scales between boys and girls or between black children and white children.*

The Motor Scale of the McCarthy Scales of Children's Abilities was used as the first indicator of the child's developmental status. It was administered by a data collection team member skilled in dealing with children and especially trained to administer the McCarthy Motor Scale items according to the specifications of the McCarthy protocol. To assess the child's behavior under a variety of circumstances, the developmental testers were particularly trained to distinguish item failures on the McCarthy Scale because of lack of ability of the child to perform the task

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*While the performance of children on the McCarthy Motor Scale is related to developing physical capability and is appropriate for estimating developing muscle coordination, it is not highly related to other estimates of developing cognitive skills. Correlations of the McCarthy Motor Scale with other ability tests including the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) and the Stanford-Binet are very low ($r \leq .10$). The correlation between the McCarthy Motor Scale and the McCarthy General Cognitive Scale (based on the published scores of the standardization sample) is higher for children in the evaluation's age range ($r = .57$ to $r = .79$). However, the three gross motor tests are not included in the computation of the General Cognitive Scale, whereas the two fine motor tests are, thereby increasing the correlation by virtue of the overlap.

Exhibit 8-1

Developmental Evaluation Measures from the McCarthy Scales of Children's Abilities

Measures	Description
McCarthy Motor Scale	
Gross Motor Tasks:	
Leg Coordination	Child performs tasks involving gross motor coordination of lower extremities; e.g., walking, standing on one foot.
Arm Coordination	Child performs tasks involving gross motor coordination of upper extremeties, e.g., bouncing a ball, catching a beanbag, throwing a beanbag through a hole in a target.
Imitative Action	Child copies simple movements; e.g., folding one's hands, crossing feet.
Fine Motor Tasks:	
Draw-A-Design	Child performs tasks requiring fine motor coordination and copies forms similar to Bender Gestalt items using a pencil and paper.
Draw-A-Child	Child draws picture of a child.
McCarthy Refusal Score	Number of test items on which child refused to cooperate in performing on McCarthy Motor Scale Tasks.

from item failures due to shyness, lack of cooperation with the examiner, or fatigue.

A second developmental indicator, also derived from the administration of the McCarthy Motor Scale, was a count of the number of items which, in the examiner's opinion, the child failed because of lack of cooperation with the testing situation rather than lack of ability to perform the task. This measure was developed for two reasons: (1) to eliminate (from the estimates of the developmental performance) children whose performance on the Motor Scale appeared to be very unreliable, and (2) to determine whether, after participation in the program, Head Start children were more able to cope with a novel situation such as the Head Start Health Evaluation and to perform tasks requested by the examiners.

Two additional measures of the child's behavior were also developed. Using a series of items developed by Walker (1978) which describe child behaviors, parents were asked how often their children behaved that way in the last two months: never, rarely, sometimes, often, or always. The parent's responses to the items were used to develop indices of the child's aggressive and/or withdrawn behavior. The specific behaviors included in each of these indices is shown in Exhibit 8-2.

It is important to point out that developmental and behavioral problems are most frequently assessed by a battery of measures far more extensive than the McCarthy Motor Scale, administered by a trained psychologist or skilled health professional. Such assessment requires an ample amount of "clinical judgment." Because far less elaborate procedures were employed in the Head Start Health Evaluation, the developmental and behavioral assessments cannot be construed as definitive indicators of developmental or behavioral problems. The assessments can, however, be used roughly to indicate the presence or absence of a problem. That is, if the child fails many more of the McCarthy Motor Scale items than expected for children of the same age; refuses to cooperate with the examiner; and is reported by his/her parent to be frequently aggressive or withdrawn, then these combined measures may indicate developmental or behavioral problems. If, however, the child performs reasonably well on the McCarthy Motor Scale, cooperates with the examiner, and is reported by his/her parent to be

Exhibit 8-2

Indices Derived From the Walker Behavior Scale

Index	Items from Walker Behavior Scale
Aggressive Child Index	Fights with children outside home;
	Gets into accidents and hurts self;
	Loses interest quickly, goes from one thing to another;
	Has a bad temper;
	Bumps into things or drops things;
	Is a squirmy, fidgety child;
	Throws and breaks things;
	Is restless; cannot sit still.
Withdrawn Child Index	Worries about many things;
	Cries easily without any apparent reason;
	Has many fears;
	Is a loner;
	Appears miserable, unhappy, tearful, and distressed;
	Stares into space;
	Is overly serious and sad.

infrequently aggressive or withdrawn, then these measures probably indicate that the child is developmentally normal. When all of these indicators do not point in the same direction, the validity of the assessment is less clear.

These developmental measures were designed specifically to address the following research questions:

- What is the prevalence of developmental and behavior problems among Head Start-eligible children?
- What developmental health services do Head Start children receive?
- What developmental services do children receive from sources other than Head Start?
- What are the impacts of the Head Start program's developmental health services on the Head Start children?

The approach to investigating these questions and the results are described below.

Analysis of the Developmental Indicators

Analysis proceeded in six stages: First, the four developmental and behavioral indicator* scores were calculated. The tasks of the Motor Scale of the McCarthy were scored according to the McCarthy protocol and converted to age-specific percentiles as described below. Each child's total Motor Scale raw score was compared with the scores of children of the same age in the McCarthy standardization sample (in three-month intervals of age) and converted to a standard score for children of that age group. The standard scores for each child were then converted into percentile scores.

The McCarthy manual provides tables which permit these conversions, given a child's age and raw Motor Scale score, as shown in Exhibit 8-3. In this example, children of different ages with the same raw score on the Motor Scale tasks receive different percentile scores when compared with children of their own age. Older children receive lower percentile scores for performance similar to younger children. The average percentile score for each

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*The four indicators are: McCarthy Motor Scale Scores, McCarthy refusals Walker Aggressive Child Index, Walker Withdrawn Child Index.

Exhibit 8-3

Example of McCarthy Percentile Score Calculation Procedure[a]

Child's Age in years	Raw Score	Standard Score	Percentile Score
3.126-3.376	25	62	87
3.376-3.625	25	58	80
3.626-3.875	25	53	60
3.876-4.125	25	47	40

[a] The McCarthy procedure could be simplified to convert each child's raw score directly into a percentile score (given the child's age group) because the standard scores are an intermediate representation of the percentile scores.

age group is 50. Hence, a typical performance on the Motor Scale, average for the child's age, is 50 and those who score above or below average receive commensurate scores based on the distribution of scores in the standardization sample of children.

For each child, a count was made of those tasks on the Motor Scale which the examiner deemed to be "refused" rather than "failed" by the child.* That is, of the 52 possible tasks which a child could attempt to perform, some of the children scored zero because, in the examiner's opinion, the child had refused to attempt the task. The refusals were scored as a continuous measure. Low scores represent fewer refusals. The refusals are an indicator of lack of cooperation or of unwillingness to cope with the testing situation at both pretest and posttest; they also serve as an indicator of unreliable measurement at pretest.

At both pretest and posttest the reliability of the fine and gross motor tasks was quite high; the Cronbach's alpha coefficient ranged from .69

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*This procedure, although not used in calculating a "standard" McCarthy percentile score, is typically used by experienced and highly trained examiners and is discussed by Hufano and Hoepfner (1974).

to .72 for the fine motor tasks, from .82 to .86 for gross motor tasks, and from .81 to .86 for the entire Motor Scale. The latter reliability estimates for the Motor Scale are very similar to those presented for the standardization sample presented in the McCarthy manual (.78 to .84 for children in 3 to 5 age range).

The ranges of these refusal scores at pretest and posttest were different. At pretest, the scores ran from zero to 52 (90% of the children refused 27 or fewer tasks, and only 23 children refused the entire scale) and at posttest from zero to 37 (90% of the children refused 5 or fewer), thereby suggesting that at least at pretest those children with very high refusal scores probably also had unreliably low McCarthy percentile scores, because each refusal would result in a zero raw score for that task of the Motor Scale. Examination of the distributions of these refusals suggested that there were four distinct groups of children: those who attempted everything (0 refusals), those who refused a few tasks (1-14 refusals), those who refused a substantial number of tasks (15-47 refusals), and those who refused essentially the entire set of tasks (48-52 refusals).*

The aggressive and withdrawn child indices were developed after factor analysis of the parents' responses to items on the Walker Behavior Scale. Each index is the sum of the weighted parents' responses (never = 1 through always = 5) to the Walker Behavior Scale items shown in Exhibit 8-2. (Low scores on these indices are better.) The reliability of the aggressive and withdrawn child indices was moderate at both pretest and posttest: the Cronbach's alpha coefficients were .73 and .63 at pretest and .74 and .68 at posttest, respectively.

The second stage of the analysis process investigated relationships between the developmental evaluation measures (percentile rank on the Motor Scale, the number of refused items, and scores on the aggressive and withdrawn child indices) and the age and gender of the child. The age relationships were determined by calculating Pearson correlations between the child's age and the child's score on each dependent measure. Gender differences were determined by using t-tests to compare differences in means between the two groups.

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*There were no children in the latter group at posttest. However, the 25 children in this group at pretest were eliminated from most presentations of the pretest results. Estimates (shown in Appendix Table 8-6) included the performance levels of all the children, regardless of how many items they refused to attempt on the McCarthy Motor Scale, using standard McCarthy scoring procedures. Similar estimates with those children removed are shown in Table 8-6 continued (for Sample A). All other analyses of the McCarthy Motor Scales presented in this chapter excluded the pretest children with the most unreliable estimates of performance.

Third, regression analyses were used to investigate the relationships between the developmental evaluation and the Head Start treatment in the longitudinal sample (A) and in the posttest sample (Samples A, B, and C). The regression analyses focused first on identifying the variables needed to adjust for differences among children in the various sites and in the Head Start and non-Head Start groups. The regression model was developed by examining the importance (F-statistic, increase in R^2) of the following background variables in predicting each dependent variable:

- child's age,
- child's gender,
- child's race (black, non-black),
- per capita income percentile,
- family employment status,
- mother's education, and
- child's pretest score (longitudinal analyses).

Race was coded as "black/non-black" to avoid the confounding of site and race. In Maricopa County, the race variable was coded as "Hispanic/non-Hispanic" and used in place of the "black/non-black" variable. Although other potential covariates were considered (e.g., wave of recruitment), only the covariates found to be significantly associated with at least three of the dependent variables in either the cross-site or within-site analyses were included.

Regression analyses were structured to enter the variables in a fixed sequence into the model: first, all of the covariates, then the three effects-coded site variables, and finally the Head Start variable. For all developmental and behavioral measures, the regression analyses were run within each site and across all sites on three sets of samples of children: cross-sectional pretest (Samples A and D), cross-sectional posttest (Samples A, B, and C) and longitudinal (Sample A at pretest and posttest).

Fourth, analyses of covariance confirming the results of the regression analyses were conducted. In these analyses, the same covariates were entered into the analyses, except that age was used as a blocking factor (in six-month intervals) with site and Head Start. The McCarthy Motor Scale percentile scores, the raw total McCarthy scores and the raw scores for the two subscales (fine and gross) were used as dependent measures to examine whether the use of the regression models with age as a covariate could bias the results on those developmental measures. These analyses and others conducted on transformations of the McCarthy Motor Scale percentile score produced essentially the same results as the regression analyses.

Finally, estimates were made of the developmental services provided by Head Start and through other sources. Information about screening, diagnosis and treatment was obtained from Head Start records. Mothers also were asked about developmental services that children had received from community sources.

Summary of Findings

Prevalence of Potential Developmental and Behavioral Problems

In order to determine the prevalence of potential developmental and behavioral problems, percentile scores of Head Start-eligible children at pretest were computed. As is shown in Exhibit 8-4, one out of three children scored below the 10th percentile on the McCarthy Motor Scales, and 54 percent scored below the 20th percentile. Children in Greene and Humphreys counties performed considerably better on this measure than children in the other three sites; children in St. Clair County performed most poorly.

Table 8-1 in the Appendix compares the mean percentile ranks of boys and girls on the McCarthy Motor Scale. Across sites, girls scored significantly higher than boys at pretest and at posttest, although differences were not significant within sites. Average McCarthy Developmental Percentile scores and refusals by age group are presented in Tables 8-2 and 8-3. There also appears to be a strong correlation between percentile scores and age and between number of refusals and age for some samples of children in one or more sites. These correlations are shown in Tables 8-4 and 8-5 in the Appendix.

Exhibit 8-4

Pretested Children Who Scored at Various Percentile levels on the McCarthy Motor Scales[a]

Percentile Score	Pretested Children (Samples A and D) in:				
	Greene & Humphreys Counties n=84	St. Clair County n=105	Maricopa County n=95	Mingo County n=62	All Sites n=346
<10	11.9	43.8	41.1	37.1	34.1
<20	32.1	66.7	55.8	58.1	53.8
<30	51.2	79.0	62.1	64.5	65.0
<40	56.0	85.7	72.6	72.6	72.5
<50	61.9	86.7	83.2	79.0	78.3
<60	75.0	94.3	92.6	85.5	87.6
<70	82.1	98.1	93.7	88.7	91.3
≥70	17.9	1.9	6.3	11.3	8.7

[a] Children who refused to cooperate with the examiner at pretest were excluded from these analyses.

In addition, we assessed what proportion of the Head Start-eligible children at pretest were identified to have potential developmental or behavioral problems on one or more of the following measures:

- Child's McCarthy Motor Scale percentile score is less than 20;
- Child refused to cooperate with examiner on more than 15 items;
- Child's aggressive index exceeds the mean by more than one standard deviation;
- Child's withdrawn index exceeds the mean by more than one standard deviation.

As Exhibit 8-5 illustrates, given a conservative application of these measures, 34 percent of the children have no evidence of developmental problems. Over half of the children fell below the 20th percentile score on the McCarthy Motor Scale. Prevalence of potential developmental or behavioral problems based on refusals and the aggressive-withdrawn indices, or on any combination of the four measures, were low.

There was some variation in the prevalence of potential problems from site to site. Prevalence was lowest (on all measures except refusals) in Greene and Humphreys Counties. The proportion of children below the 20th percentile on the McCarthy Motor Scale was highest in St. Clair County (66%). Refusals were most common in Mingo County, while prevalence of potential problems of aggression and/or withdrawal was lowest in Greene and Humphreys Counties. Maricopa County had prevalence of withdrawal problems that was approximately eight times that found in Greene and Humphreys and three times that of Mingo County.

Developmental Services Provided Through Head Start

According to interviews with Head Start directors and health coordinators in each of the sites, the Head Start developmental assessments are performed by classroom teachers trained to administer a locally determined, usually unstandardized series of tasks. These teacher-administered assessments are reportedly performed on all children once a year in all sites, except Mingo County where they are reportedly performed three times per year. Based on the teachers' screening, children who "fail" are referred for a more complete evaluation by mental health professionals. The latter services are paid for through the handicapped component of Head Start.

Head Start health records provide information about whether Head Start children received a developmental screen after entering Head Start, whether the screen indicated significant findings and, if there were findings, whether Head Start provided treatment or a referral. There were records for only 334 children regarding whether they had received a developmental screen. Data on the 334 children are presented in Exhibit 8-6.

Across the four sites 41 percent of the Head Start children received a developmental screen by Head Start. Of the children who were screened, 16 percent were found to have a problem requiring professional diagnostic services. Only one of three children with potential problems received services according to the records.

Exhibit 8-5

Pretested Children Who Scored Below Criterion[a] on One or More Developmental or Behavior Measures at Pretest[a]

Developmental or Behavior Measure		Pretested Children (Samples A and D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
MMS	n	38	75	53	44	210
	%	40.0	66.4	55.8	60.3	55.9
REF	n	14	19	3	17	53
	%	14.7	16.8	3.2	23.3	14.1
AI	n	4	21	16	13	54
	%	4.2	18.6	16.8	17.8	14.4
WI	n	3	22	24	6	55
	%	3.2	19.5	25.3	8.2	14.6
MMS+REF	n	14	18	3	14	49
	%	14.7	15.9	3.2	19.2	13.0
MMS+AI	n	3	16	9	6	34
	%	3.2	14.2	9.5	8.2	9.0
MMS+WI	n	1	17	13	3	34
	%	1.1	15.0	13.7	4.1	9.0
AI+WI	n	0	8	8	2	18
	%	0.0	7.1	8.4	2.7	4.8
MMS+REF+AI	n	1	3	1	4	9
	%	1.1	2.7	1.1	5.5	2.4
MMS+AI+WI	n	0	6	5	0	11
	%	0.0	5.3	5.3	0.0	2.9
None of above		54 56.8	29 25.7	27 28.4	19 26.0	129 34.3

[a] MMS < 20: McCarthy Motor Scale less than 20th percentile.
REF > 15: McCarthy refusals greater that 15 items.
AI > 3.14: Aggressive Index greater than mean plus one standard deviation or 3.14
WI > 2.19: Withdrawn Index greater than mean plus one standard deviation or 2.19

Exhibit 8-6

Developmental Services Provided to Head Start Children According to Head Start Health Records in Each Site

Develop-mental Services		Posttested Children (Samples, A, B, C) in:				
		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=102	Mingo County n=112	All Sites n=449
Children Screened	n	65/107	1/72	3/76	67/79	136/334
	%	60.7	1.4	3.9	84.8	40.7
Children Found to Have a Problem	n	18/64	0/1	1/3	2/65	21/133
	%	28.1	0.0	33.3	3.1	15.8
Children Received Services	n	5/18	0/0	1/1	1/2	7/21
	%	27.8	0.0	100.0	50.0	33.3

Some Head Start programs do notably better in screening children for developmental or behaviorial problems. Mingo County Head Start did screens on 85 percent of the enrolled children. The program in Greene and Humphreys Counties screened 61 percent; this site also identified far more children with potential problems (one out of four) than did the other three sites.

The results of our developmental evaluation and the Head Start developmental assessments are not directly comparable. Head Start's assessments can identify more children needing services than our evaluation because the Head Start assessment is broader and covers more areas of potential problems. Comparisons between findings from Head Start screens and our evaluations show differences which suggest that Head Start may be underreferring. Among those 136 children identified by their Head Start health record as having been screened by Head Start for developmental problems, the Head Start Health Evaluation found 27 (20%) to have some important developmental finding (measured as performance below the 10th percentile on the McCarthy Motor Scale). Head Start reported developmental findings for 21 (15.%) of the screened children. However, 22 of the 27 children found to have an important developmental finding were considered to have "normal" screens by Head Start. In other words, assessments of developmental findings made by our evaluation and Head Start were in agreement for only five out of 21 (25%) of the cases.

In addition, our evaluation identified 36 (18%) out of 198 children who did not receive a developmental assessment to be in need of diagnostic services. Thus, detection of developmental findings by our evaluation was approximately equal (20 vs. 18%) among those children who did and did not receive a developmental assessment.

Site differences in the provision of diagnostic or remedial services are difficult to interpret because so few children were referred. The program referred three children. This evaluation also showed that they needed a referral. Head Start referred four others whom our evaluation did not identify (and there is no way, as indicated above, to verify the appropriateness of the latter referrals).

The content of the developmental services that Head Start provides cannot be assessed directly from the health abstract records. However, a review of individual records of the three children for whom developmental findings were recorded by both Head Start and our evaluation provides some information about the types of developmental problems identified and the validity of the concerns about those children. Notes about the specific problems of individual children were often recorded by members of our data collection team. Notes concerning these children included the following from various domains of the evaluation:

- "Failure to thrive, general developmental delay, infantile approach to objects, poor muscle tone" (pediatrician's notes); "poor comprehension and expression, delay in speech development" (speech pathologist's notes); "poor processing skills" (audiologist's notes).
- "Developmental delay" (pediatrician's notes); "speech delay, fails to integrate thoughts into sentences, difficulty with oral motor coordination, apraxia" (speech pathologist's notes).
- "Speech delay, recommend speech evaluation, check auditory processing skills" (speech pathologist's notes)

It is clear from the above discussions that there is considerable room for improving developmental, diagnostic, and remedial services in all sites. Developmental screenings of children also could be improved, especially in St. Clair and Maricopa Counties.

Developmental Services Provided Through Other Sources

At posttest, all parents were asked whether their children had received developmental screens within the last year. Results, reported in the impact section, show that non-Head Start children are much less likely to be screened for potential developmental or behavioral problems.

Impact of Head Start Developmental Services on Children

The beneficial effects that the Head Start program might have on children's developmental progress and behavior were hypothesized to occur through three mechanisms. First, Head Start programs screen children for developmental problems and provide direct services or make referrals for remedial services. If such services are received, Head Start children would be expected to score higher on the McCarthy Motor Scale, and lower on the aggressive and withdrawn indices. Second, all children who regularly engage in motor development activities within the Head Start program setting might be expected to perform better on the McCarthy Motor Scale than children who spend most of their time at home. Thus, even beyond providing developmental screens and direct developmental services, the Head Start program may encourage progress in motor development through indirect services in all participating children. Third, Head Start provides children with a wide range of challenging activities to encourage development of their sense of "I can do that!" If this program is effective, children should be less threatened by the novel testing situation and be more willing to cooperate with the developmental tester. Head Start's affects on these three outcome measures was assessed for the longitudinal and cross-sectional samples.

Longitudinal Analyses. As noted in Exhibit 8-7, there was a substantial decrease from pretest to posttest in the proportion of children who scored below the 20th percentile on the McCarthy Motor Scales. A decrease was evident in both groups, but it was larger for the Head Start group (19%)

Exhibit 8-7

Percentage of Longitudinal Children Who Scored at Various Percentile Levels on the McCarthy Motor Scale[a]

Percentile Score	Longitudinal Children (Sample A) In:																			
	Greene & Humphreys Counties				St. Clair County				Maricopa County				Mingo County				All Sites			
	HS n=36	NHS n=30	HS n=36	NHS n=30	HS n=24	NHS n=14	HS n=24	NHS n=14	HS n=40	NHS n=16	HS n=40	NHS n=16	HS n=17	NHS n=15	HS n=17	NHS n=15	HS n=117	NHS n=75	HS n=117	NHS n=75
	Pretest		Posttest		Pretest		Posttest		Pretest		Posttest		Pretest		Posttest		Pretest		Posttest	
< 10	11.1	10.0	13.9	13.3	33.3	28.6	12.5	21.4	35.0	56.3	25.0	25.0	35.3	26.7	41.2	20.0	27.4	26.7	21.4	18.7
< 20	27.8	26.7	22.2	40.0	70.8	42.9	12.5	28.6	50.0	56.3	40.0	37.5	64.7	40.0	52.9	26.7	49.6	38.7	30.8	34.7
< 30	47.2	50.0	38.9	53.3	83.3	71.4	33.3	28.6	60.0	56.3	55.0	50.0	76.5	40.0	76.5	46.7	63.2	53.3	48.7	46.7
< 40	52.8	53.3	44.4	76.7	95.8	85.7	41.7	35.7	72.5	68.8	62.5	68.8	76.5	53.3	88.2	46.7	71.8	62.7	56.4	61.3
< 50	55.8	66.7	63.9	76.7	95.8	85.7	58.3	35.7	85.0	81.3	77.5	68.8	82.4	53.3	88.2	60.0	77.8	70.7	70.9	64.0
<60	69.4	80.0	72.2	86.7	100.0	92.9	66.7	57.1	95.0	93.8	82.5	81.3	88.2	60.0	94.1	86.7	87.2	81.3	77.8	80.0
<70	77.8	90.0	91.7	90.0	100.0	92.9	75.0	57.1	97.5	93.8	87.5	87.5	94.1	60.0	94.1	100.0	91.5	85.3	87.2	85.3
70+	22.2	10.0	8.3	10.0		7.1	25.0	42.9	2.5	6.2	12.5	12.5	5.9	40.0	5.9		8.5	14.7	12.8	14.7

[a] Children who refused to cooperate with the examiner at pretest eliminated from results at both pretest and posttest.

than the non-Head Start group (4%),* suggesting that Head Start has its most profound impact on the children who are in most need of the program's direct and indirect services for their needs. Regression analyses, adjusting for various background characteristics and taking the pretest score into account, indicate that, across sites, group differences on the McCarthy Motor Scales are not statistically significant, except in Greene and Humphreys Counties. Head Start children performed better on both the McCarthy Motor Scale and the McCarthy refusal index. This site has the only full-day, five-day a week Head Start program in the study. What this finding may suggest is that full-day Head Start is more effective than part-day programs in terms of the motor development of children and their adaptability to new situations. Results of the regression analyses are presented in Table 8-9 in the Appendix.

Similar analyses were undertaken to assess Head Start effects on the aggression and withdrawn indices. Unadjusted comparisons between the Head Start and non-Head Start groups at pretest and posttest are given in Table 8-6 in the Appendix. Only in St. Clair Country did regression analyses yield a significant group difference, with Head Start children being less withdrawn as a result of Head Start intervention than children in the non-Head Start group (see Table 8-9 in the Appendix).

Cross-Sectional Analyses. Exhibit 8-8 shows the proportion of Head Start and non-Head Start children in the cross-sectional sample (A, B and C) who scored below criterion on one or more developmental or behavioral problems. Fewer Head Start than non-Head Start children fell below the 20th percentile on the McCarthy Motor Scale, and refusals and aggressive behavior were also less common. Head Start children tended to be slightly more withdrawn than non-Head Start children. None of these group differences turned out to be statistically significant according to regression results presented in Appendix Tables 8-10.**

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*Table 8-6 shows unadjusted comparisons on the four developmental indicators at both pretest and posttest by site. Average scores for the McCarthy Motor Scale and the number of refusals are presented in Tables 8-7 and 8-8.

**Descriptive statistics on the cross-sectional posttest sample are presented in Tables 8-11 through 8-14.

Exhibit 8-8

Percentage of Posttest Children Who Scored Below Criterion[a] on One or More Developmental or Behavior Measures at Posttest

Developmental or Behavior Measure Criterion		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
MMS	n	23	47	19	21	51	26	51	44	144	138
	%	18.1	46.5	17.6	24.4	48.1	42.6	42.9	40.4	31.3	38.7
REF	n	2	11	1	3	0	0	1	1	4	15
	%	1.6	10.9	0.9	3.5	0.0	0.0	0.8	0.9	0.9	4.2
AI	n	9	5	6	16	21	14	20	21	56	56
	%	7.1	5.0	5.6	18.6	19.8	23.0	16.8	19.3	12.2	15.7
WI	n	6	3	13	11	41	21	21	18	81	53
	%	4.7	3.0	12.0	12.8	38.7	34.4	17.6	16.5	17.6	14.8
MMS+REF	n	2	11	1	3	0	0	1	1	4	15
	%	1.6	10.9	0.9	3.5	0.0	0.0	0.8	0.9	0.1	4.2
MMS+AI	n	3	4	1	2	15	5	9	10	28	21
	%	2.4	4.0	0.9	2.3	14.2	8.2	7.6	9.2	6.1	5.9
MMS+WI	n	0	1	5	3	20	10	13	9	38	23
	%	0.0	1.0	4.6	3.5	18.9	16.4	10.9	3.3	8.3	6.4
AI+WI	n	1	1	0	4	12	3	8	9	21	17
	%	0.8	1.0	0.0	4.7	11.3	4.9	6.7	8.3	4.6	4.8
MMS+REF+AI	n	0	1	0	0	0	0	1	0	1	1
	%	0.0	1.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
MMS+AI+WI	n	0	1	0	1	8	3	3	5	11	10
	%	0.0	1.0	0.0	1.2	7.5	4.9	2.5	4.6	2.3	2.8
None of the Above	n	93[b]	51	76[b]	46	32	15	54	49	255[b]	161
	%	73.2	50.5	70.4	53.5	30.2	24.6	45.4	45.0	55.4	45.1

[a] MMS < 20: McCarthy Motor Scale less than 20th percentile.
REF > 15: McCarthy refusals greater than 15 items.
AI > 3: Aggressive Index greater than mean plus one standard deviation or 3
WI > 2.25: Withdrawn Index greater than mean plus one standard deviation or 2.25.

[b] Head Start significantly greater than non-Head Start; $p \leq .05$.

Within-site analyses on the cross-sectional sample show signficant Head Start effects only in Greene and Humphreys Counties. Head Start children had higher McCarthy percentile scores, had fewer refusals and were less likely to considered aggressive by their mothers. This replicates (although not entirely) findings reported for the longitudinal sample of children.

Exhibit 8-9 also shows a significant Head Start effect, both across and within sites, with regard to the proportion of children who received a screen for developmental and behavioral problems. Forty-one percent of the Head Start children received such a screen compared to only 8 percent of the non-Head Start children. Most of the Head Start children were screened by the program, rather than by another resource in the community.

Confirmatory analyses, using analysis of covariance and blocking on the age of child in six-month intervals, produced virtually identical results as the regression analyses--whether the dependent measure was the McCarthy total score, or either of the raw Motor sub-Scales (for fine and gross motor coordination). The Head Start children in Greene and Humphreys Counties out-performed the non-Head Start children. Transformations of the McCarthy percentile scores also produced identical results.

Conclusions

The developmental evaluation demonstrates that Head Start can effectively improve children's muscular coordination and ability to perform in a novel situation. Of the four sites, the one which was most successful was Greene and Humphreys Counties, the only program in the study which provide services to the children full time, five days per week.

Although the difference between the performance of the Head Start children is statistically significant in one site only, there is evidence in two sites that Head Start is associated with developmental gains for children with the lowest scores at pretest--the children who would appear to need the program the most. In these sites, the proportion of the children in the Head Start group at posttest who remained below the 20th percentile on the McCarthy Motor Scale is smaller than the proportion of the non-Head Start children, demonstrating an important pattern of Head Start effects.

Exhibit 8-9

Percentage of Head Start and Non-Head Start Children Receiving Developmental Screens Through Head Start and Other Sources

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
DEVELOPMENTAL SCREEN	N	110	92	95	73	87	54	108	95
	n	36	3	36	4	37	11	55	6
	%	32.7	3.3	37.9	5.5	42.5	20.4	50.9	6.3
		CHI SQ = 27.921 DF = 1 P = 0.000		CHI SQ = 23.910 DF = 1 P = 0.000		CHI SQ = 7.286 DF = 1 P = 0.007		CHI SQ = 47.851 DF = 1 P = 0.000	
DEVELOPMENTAL SCREEN THROUGH HEAD START	N	36	3	36	4	37	11	55	6
	n	25	0	32	0	23	0	54	0
	%	69.4	0.0	88.9	0.0	62.2	0.0	98.2	0.0
		CHI SQ = 3.178 DF = 1 P = 0.075		CHI SQ = 17.778 DF = 1 P = 0.000		CHI SQ = 13.129 DF = 1 P = 0.000		CHI SQ = 51.335 DF = 1 P = 0.000	

From the combination of the four measures of development and behavior, it appears that nearly half of the children are not seen to have a developmental problem. Fortunately, only two to three percent of the children appear to have multiple problems on these measures and these children appear to be in need of handicapped services for developmental delay.

CHAPTER NINE

SPEECH AND LANGUAGE EVALUATION

Speech and Language Indicators

There have been numerous studies of Head Start's impacts on the language achievement of children and many have demonstrated the program's successes in improving the average language achievement scores of Head Start children. However, few studies have focused directly on the children with problems in language and those with communications disorders as evaluated by a licensed speech pathologist. This is the major difference in the methodology used by the Head Start Health Evaluation.

The speech and language evaluation consisted of two parts--a speech problem component and a language comprehension component. The evaluation combined both of these components to address Head Start's mandate to provide screenings and follow-up services to children with speech and/or language comprehension problems.

Two measures were administered as part of the speech problem component--the Denver Articulation Screening Examination (DASE) and a portion of the Physician's Developmental Quick Screen for Speech Disorders (PDQ). A brief description of these two measures is presented below:

- The Denver Articulation Screening Examination (DASE) is a five-minute test appropriate for children 2-1/2 to 7 years of age. A child is presented with a picture (such as a wagon); the examiner points to the object and asks the child to name it. A child receives a score of one for each sound accurately articulated (in this example, wagon, both w and n are the important sounds). According to Pediatric Screening Tests, the DASE may provide the most accurate results for disadvantaged children because it was standardized on a large sample of representative children (1,400 white, black and Hispanic preschoolers).
- The Physician's Developmental Quick Screen for Speech Disorders, a five-minute test designed by Kulig and Baker, assesses other speech characteristics. Items concerning intelligibility, voice quality, typical pitch, and typical volume were included in the evaluation.

To identify potential speech problems, children's scores on the DASE were compared with expected minimum scores for children in the same age group. If the child failed to meet the minimum score, he or she was identified as having a potential problem with speech articulation. In addition, children who were noted as having abnormal speech characteristics on the portion of the PDQ that was administered were identified as having potential speech quality problems. These two variables and the sum of the two were used in analyses.

It is important to point out that both measures are screening devices designed to identify children in need of further professional diagnostic evaluation to determine whether a speech problem exists. Results cannot be used as a definitive indicator of speech problems.

The assessment of language comprehension problems also consisted of two measures--the Assessment of Children's Language Comprehension (ACLC) and the Fluharty Language Screening Test for Preschool Children. Both were intended as screening devices and thus do not yield information about the language development of children. A brief description of these two measures follows:

- The Assessment of Children's Language Comprehension (ACLC) was developed by Foster, Gidden and Stark (1973). It was designed for the purpose of identifying individual children who have difficulty processing auditory information and was not intended to rank pupils in a class. The ACLC consists of four sections (one, two, three, and four critical elements) which measure the child's ability to process an increasing number of syntactic units (words). A child is shown a picture and presented with a stimulus word; the child then points to what s/he thinks is the appropriate stimulus object in the picture. A score of one is tallied for each object accurately identified. A total score is computed for each critical element section, indicating total number of items passed, failed, and refused. The ACLC was chosen because it avoids problems associated with children's comprehension of culturally biased syntax structures, which may be subject to a significant amount of dialectic variation. No percentile ranks or standard scores are published for the ACLC because the authors strongly recommend against their use.*

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*Manual for the Assessment of Children's Language Comprehension: Consulting Psychologists Press, Inc., California (1973).

- The Fluharty Language Screening Test for Preschool Children (Sentence Repetition component) measures verbal expression. Norms for this test were established by testing 203 children from lower to middle socioeconomic backgrounds. Black children and white children were included in the norms. The Fluharty has high intra- and intertester reliability as well as high validity with other diagnostic tests. It is considered to be very sensitive in identifying children who are in need of a complete speech and language evaluation. A child repeats the stimulus sentence produced by the examiner and receives a score of one for each sentence repeated accurately. (The examiner also indicates exactly which part of the sentence was inaccurately produced.) A composite pass/fail score, computed by summing scores across sentences, can be compared with published norms.

The ACLC and Fluharty scores and the sum of the two scores were used in the analyses. In addition, a score was computed to assess deficiencies in either speech or language comprehension. Because the ACLC has no norms, to estimate deficiencies, we calculated the average score for children in each (six months) age group. The criterion for flagging the child as deficient was performance below the average for children one year younger on two or more ACLC subtests. Finally, data were obtained about speech and language services (screens and referrals/treatment) from Head Start health records and interviews from parents. The variables used are defined in Exhibit 9-1.

The speech and language evaluation was administered by a speech pathologist recruited from the local community, who was familiar with the regional dialect. In Maricopa County, where the majority of the children spoke Spanish, the tests were administered first in the child's dominant language--either Spanish or English,* and if the child was bilingual, repeated in the second language.

The speech and language evaluation addressed the following research questions:

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*The Del Rio Language Screening Test was administered in Maricopa County at the time the children were pretested. Subsequent analyses indicated that the children's responses to the Del Rio, when scaled, were not interpretable in the context of the evaluation. Therefore, the posttest administered in Maricopa County was changed to correspond to that administered in the other sites. This change precluded a longitudinal evaluation in Maricopa County.

Exhibit 9-1

Speech and Language Evaluation Measures

Speech Measures	Definition
Articulation	Item score on Denver Articulation Screening Examination (DASE). Deficient if child's score is below published screening cutoff.
Speech Quality	From Physician's Developmental Quick Screen for Speech Disorders. Deficient if examiner noted at least one problem with quality of the child's speech (tone, stuttering, hoarseness, etc.).
Speech Deficiency	Deficient if child is scored as deficient in either articulation and speech quality.
Language Comprehension Measures	Definition
Language Comprehension 1 critical element 2 critical elements 3 critical elements 4 critical elements	Item score on Assessment of Children's Language Comprehension (ACLC). Deficient if child's score is at least one year behind average score on at least two ACLC subtests.
Verbal Expression	Item score on Fluharty Preschool Speech and Language Screening Test (Repetition sub-test). Deficient if child's score is below published screening cutoff.
Language Comprehension Deficiency	Deficient if child is scored as deficient on either language comprehension and verbal expression.
Speech Services	Definition
Head Start Screen	Child received a speech screen after entering Head Start.
Head Start Findings	Child was found by Head Start to have a speech problem.
Head Start Treatment/ Referral	Child was given treatment or referred for speech problem.

- What is the prevalence of speech and language comprehension problems in Head Start-eligible children?
- What speech services do Head Start children receive?
- Do children receive speech services through other (non-Head Start) sources?
- What are the impacts of Head Start on remediation of children's speech and language problems?

Our approach to investigating these questions and the results obtained are described below.

Analysis of the Speech and Language Data

Analysis proceeded in several phases. First, relationships between the speech items and language comprehension items and age and gender variables were investigated. The age relationships were determined by calculating Pearson correlations (age in months vs. number correct and age in months vs. number refused). Age is strongly correlated with ACLC, DASE, and Fluharty scores. Gender differences were determined by using F-tests to compare differences in means. Results are reported in Tables 9-1 and 9-2 in the Appendix.

Second, the distributions of responses to individual test items, including changes from pretest to posttest, were examined within and across sites. It was determined that data were unreliable for children who refused 25 or more items across the entire test battery; these children, therefore, were excluded from further analyses.

Third, principal components factor analyses were performed to reduce the number of dependent variables. These analyses revealed that the Fluharty appears to measure both language comprehension and speech (see Table 9-3 in the Appendix). For this reason, we have combined DASE and Fluharty scores in some analyses to determine prevalence of speech problems or Head Start impacts in this area.

Fourth, the prevalence of speech and language comprehension problems was estimated for the evaluated children. In addition, estimates were made of the speech and language services provided by Head Start and through other sources. To determine whether Head Start had an impact in remediating speech and language comprehension deficiencies, we compared what proportion of the Head Start and non-Head Start children in the longitudinal sample (A) had potential problems identified at both pretest and posttest.

Finally, regression analyses were used to investigate the relationships between speech and/or language comprehension deficiencies and Head Start treatment. The regression analyses focused first on identifying the variables needed to adjust for differences among children in the various sites and Head Start and non-Head Start groups. Then, using those covariates, the analyses examined various samples of children for a Head Start effect. Children's scores on each of six components of the speech evaluation --ACLC: one, two, three, and four critical elements; DASE; and Fluharty-- were used as dependent variables. The total number of areas failed, based on the pass/fail criteria presented in Table 9-4, also was a dependent variable. Only those children who completed the entire test battery were included in the analyses.

The regression model, including covariates, was developed by examining the importance (F-statistic, increase in R^2) of the following background variables in predicting each of the dependent variables:

- child's age;
- child's gender;
- child's race (black, non-black);
- family income percentile;
- family employment status; and
- mother's education.

Race was coded as "black/non-black" to adjust the confounding of site and race. In Maricopa County, the race variable was coded as "Hispanic/non-Hispanic" and used in place of the "black/non-black" variable. Although other potential covariates were considered (e.g., wave of recruitment) only the covariables found to be significantly associated with at least three of the dependent variable in either the across- or within-site analyses were included.

Analyses were structured so that the variables were entered in a fixed sequence into the regression model: first, all of the covariates, then the three effect-coded variables, and finally the Head Start variable.

Regression analyses were run within each site, across all sites, and across all sites except Maricopa County, which contained a large number of bilingual children and which showed unusual data associations.*

Summary of Findings

Prevalence of Speech and Language Comprehension Problems

The prevalence of potential speech and language comprehension problems in the three non-bilingual sites is presented in Exhibit 9-2. The prevalence of problems was extremely high, with two out of three children identified as being in need of professional diagnostic services for speech and/or language comprehension problems. The latter problems (as measured by the ACLC and Fluharty) were somewhat more common than problems with speech (DASE and PDQ).

There was some site variation in the prevalence of problems. Children in Greene and Humphreys Counties and in Mingo County were more likely to be in need of professional diagnostic services for speech or language comprehension problems than children in St. Clair County. Prevalence of both speech and language problems was lowest in St. Clair County.

On the Denver Articulation Screening Examination (DASE), the only screen with normed reference data, the prevalence of articulation problems in the Head Start Health Evaluation at pretest was slightly higher (20%) than in the normed sample (defined to be 15%). This slightly higher overall prevalence is due to children in Greene and Humphreys Counties (26%) and in Mingo County (23%); children in St. Clair County had a prevalence of articulation problems (14%) that was slightly below the normed sample.

The prevalence figures reported here reflect only whether a child failed a speech and language screen; they do not indicate how many children had "borderline" scores and how many children failed the screen by a wider margin. To examine the degree of failure, screening norms were lagged first

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*Age was not significantly related to speech and language scores in Maricopa County--an unexpected finding since speech and language should improve with age. Moreover, children in Maricopa County scored unusually high for their age, a result that is counterintuitive for a bilingual site. These findings might be the result of a ceiling effect on the speech exam by the relatively older children in Maricopa County; i.e., many of the children received perfect or nearly perfect scores.

Exhibit 9-2

Children Identified to be in Need of Diagnostic Services for Speech and Language Comprehension[a]

Speech and Language Comprehension Measures		Pretested Children (Samples A and D) in:			
		Greene or Humphreys Counties	St. Clair County	Mingo County	All non-Bilingual Sites
Any deficiency (either speech or language comprehension)	n	59/85	47/92	39/53	142/230
	%	69.4	51.1	73.6	63.0
Speech					
Denver Articulation Screening Examination (DASE)	n	22/85	13/92	12/52	47/229
	%	25.9	14.1	23.1	20.4
Speech Quality (Physician(s Developmental Quick Screen for Speech Disorders)	n	29/73	24/90	21/46	74/209
	%	39.7	26.7	45.7	35.4
Any Speech Deficiency (DASE or PDQ)	n	39/85	28/92	26/53	93/230
	%	45.9	30.4	49.1	40.4
Language Comprehension					
Assessment of Children's Language Comprehension (ACLC)	n	41/85	27/87	7/28	75/221
	%	48.2	31.0	25.0	33.9
Sentence Repetition of Fluharty Screening Test for Preschool Children	n	27/85	12/92	28/52	67/229
	%	31.8	13.0	53.8	29.3
Any Language Comprehension Deficiency (ACLC or Fluharty)	n	51/85	35/92	29/53	115/230
	%	60.0	38.0	54.7	50.0

[a] Pretest data are not available for the bilingual site, Maricopa County.

by six months and then by a full year (see Exhibit 9-3 and Table 9-5) to determine whether maturation would make a difference. That is, if a 4-year-old were judged on 3-year-old level norms, would the speech or language deficiency "disappear." If so, Head Start might decide that, intervention for that child had a lower priority than intervention for some other child's problem.

It is evident that nearly a third of the children who were identified as deficient on the ACLC were within six months of having a non-deficient level of language comprehension, and over half were within a year of this level. However, nearly 90 percent of children screened as having articulation problems (DASE) were more than a year behind the reference standard, and nearly 80 percent of the children who were screened as deficient on the Flaharty were more than a year behind. These figures suggest that the

Exhibit 9-3

Children Identified To Be in Need of Diagnostic Services
for Speech and Language Comprehension by Different
Age Cutoffs Across Sites

	Pretested Children (Samples A and D) in:		
	At Pretest	Six-Month Lag	One-Year Lag
Any Deficiency	63.0	52.2	46.1
Speech			
DASE	20.5	17.9	17.9
PDQ	35.4	23.4	19.6
Any	40.4	31.7	28.7
Language Comprehension			
ACLC	33.9	23.1	15.8
Fluharty	29.3	26.2	23.1
Any	50.0	38.5	30.9

Head Start program may want to focus attention on providing services to children who fail the articulation (DASE) and repetition (Fluharty) screens. These figures also indicate that the evaluation's battery of speech and language screens may be somewhat conservative and includes a proportion of children with speech and language deficiencies which are correctable through maturation.

Speech and Language Services Provided Through Head Start

The Head Start Performance Standards state that "during the course of the health screening, procedures must be in effect for identifying speech problems, determining their cause, and providing services." At posttest, data were abstracted from Head Start health records of children in the evaluation to determine what proportion had received a speech screen, was diagnosed to have a speech problem, and was referred for or received treatment. As shown in Exhibit 9-4, one out of three Head Start children had been screened for speech or language comprehension problems. Of the children who

Exhibit 9-4

Speech and Language Services Provided to
Head Start Children According to Head Start Health Records

Speech and Language Services		Posttested Children (Samples A, B, and C) in:				
		Greene or Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Children screened	n	50/127	70/108	17/102	3/112	140/449
	%	39.4	64.8	16.7	2.7	31.2
Children with diagnosed speech or language comprehension problems (% of children screened)	n	12/50	8/70	14/17	1/3	35/140
	%	24.0	11.4	82.4	33.3	25.0
Children who received services	n	10/12	3/8	13/14	1/1	27/35
	%	83.3	37.5	92.9	100.0	77.1

were screened, 25 percent were diagnosed as having a speech and/or language comprehension problem; the majority of these children (77%) received remedial services. These data suggest that there is an urgent need for Head Start to improve its screening services, but that the program is generally successful in treating those few children who, when screened, are found to have problems. (As shown in Table 9-6 in the Appendix, there was a fairly high level of agreement between results of screens conducted by the Head Start Health Evaluation and findings recorded in the health records, particularly in identifying children with either a speech or language comprehension problem.)

There was considerable site variation in the proportion of children who were screened, were found to have speech problems, and were referred for or received treatment for such problems. In both St. Clair County and Greene and Humphreys Counties, a considerable percentage of Head Start children were screened. (In St. Clair, one out of four children were screened prior to entering Head Start.) A more selective process for screening seems to have been used in both Maricopa and Mingo Counties. What the data suggest is that Head Start classroom teachers (or parents) in these two sites identify children suspected of having speech and/or language comprehension problems and arrange for diagnostic screening only for those children. In Maricopa County, of the group that was screened, 82 percent of the children were, in fact, found to have a problem.* Furthermore, children with speech problems in Maricopa and Mingo Counties were more likely to receive treatment than in the other sites.

Although St. Clair County Head Start screened more children than programs in other sites, it only arranged for treatment services for about one-third of children with problems. It is unclear whether this is due to lack of emphasis on such services or whether responsibility for following-up referrals is left to parents, who then fail to take their children for required treatment.

We also investigated whether certain special groups of Head Start children were more likely than others to have been screened for speech and language comprehension problems or to have received treatment. Several

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*The theory of "selective screening" was confirmed in comparisons of children with speech problems who had or had not been screened, as illustrated in Exhibit 9-5. This emphasis appears strongest in Maricopa County and less so in Mingo County, where very few children were screened.

Exhibit 9-5

Comparison of Speech Findings for Head Start Children Screened and Not Screened[a]

Type of Deficiency		Posttested Children (Samples A, B, and C) in:				
		Greene or Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Speech and/or Language Comprehension						
Screened	n	21/50	34/70	9/17	2/3	66/140
	%	42.0	48.6	64.3	66.7	48.2
Not Screened	n	34/77	18/30	17/67	56/109	125/291
	%	44.2	47.6	25.4*	51.4	43.0
Speech Problems						
Screened	n	16/49	22/70	5/17	1/2	44/135
	%	32.7	31.4	35.7	50.0	32.6
Not Screened	n	22/73	14/38	12/64	43/103	91/278
	%	30.1	36.8	18.8	41.7	32.7
Language Comprehension						
Screened	n	13/50	21/70	7/17	2/3	43/137
	%	26.0	30.0	50.0	66.7	31.4
Not Screened	n	19/77	11/38	9/67	22/109	61/291
	%	24.7	28.9	13.4*	20.2*	21.0*

[a] Statistical significance indicated as * for p = <.05.

significant results are evident. Most consistently, if a mother thinks that her child has a speech problem, Head Start is far more likely to provide speech services. Moreover, Head Start provides more speech services to children who are covered by medical insurance or who have easy access to medical care. There are also indications that children from families with the lowest family incomes and those who were born to teenaged mothers receive more speech services from Head Start. There is no evidence, however, that children from families with prior Head Start experience have fewer speech or language comprehension problems (as shown in Table 9-7 in the Appendix). What the findings suggest is that Head Start is responsive to mothers' concerns about their children's speech or language comprehension, but tends to provide screens and services to children who are most easily served (see Exhibit 9-6 and Tables 9-8 through 9-10 in the Appendix). This suggests that Head Start is performing a critical service to low-income children, particularly in view of the fact that prevalence of potential problems is relatively high.

Speech and Language Services Provided Through Other Sources

As part of the medical history interview, mothers were asked whether the child had seen a doctor or speech therapist or received special training for a speech problem. If speech services were received, mothers were asked whether the services were provided through Head Start. Only very few children (three in St. Clair County, one in Maricopa County, and five in Mingo County) had received a speech exam through a source other than Head Start, and none received speech training other than through Head Start (see Exhibit 9-7).

Impact of Head Start on Remediation of Children's Speech and Language Comprehension Problems

Longitudinal Analyses. To determine whether Head Start services had an impact in remediating speech and language comprehension problems, we compared what proportion of the Head Start and non-Head Start children in the longitudinal sample (A) were identified to be in need of professional diagnostic services at both pretest and posttest. As is illustrated in Exhibit 9-8, 17 percent fewer Head Start than non-Head Start children across the three non-bilingual sites were identified as having any deficiency (speech and/or language comprehension) at both timepoints. A similar trend was evident within all non-bilingual sites. None of the group differences (either across or within sites) was statistically significant ($p < .05$), however.

Exhibit 9-6

Summary of the Delivery of Head Start Speech and Language Services Provided to Special Groups of Children

	Greene & Humphreys Counties (n=206)	St. Clair County (n=175)	Maricopa County (n=112)	Mingo County (n=168)	Across All Sites (n=661)	Across All Non-Bilingual Sites (n=549)
Per capita income < $1295 versus higher					low income -> more screens ($p < .01$)	low income -> more screens ($p < .05$)
Mother's education < 12 years versus higher						
Mothers < 18 years at birth of child versus higher			older mothers -> more treatment referrals ($p - .05$)		older mothers -> more treatment/ referrals ($p < .05$)	
Mother reports speech problems versus not	problem -> more screens ($p < .05$)		problem -> more screens ($p < .001$)		problem -> more screens ($p < .001$) and more treatment/ referrals ($p < .01$)	problem -> more screens ($p < .05$) and more treatment/ referrals ($p < .05$)
Medical insurance versus no medical insurance	insurance -> fewer screens ($p < .05$)				insurance -> more screens ($p < .05$) and more treatment/ referrals ($p = .01$)	
Easy Access to medical care versus difficult					easy access -> more screens ($p = .05$)	
Participate in subsidy program versus not						

Exhibit 9-7

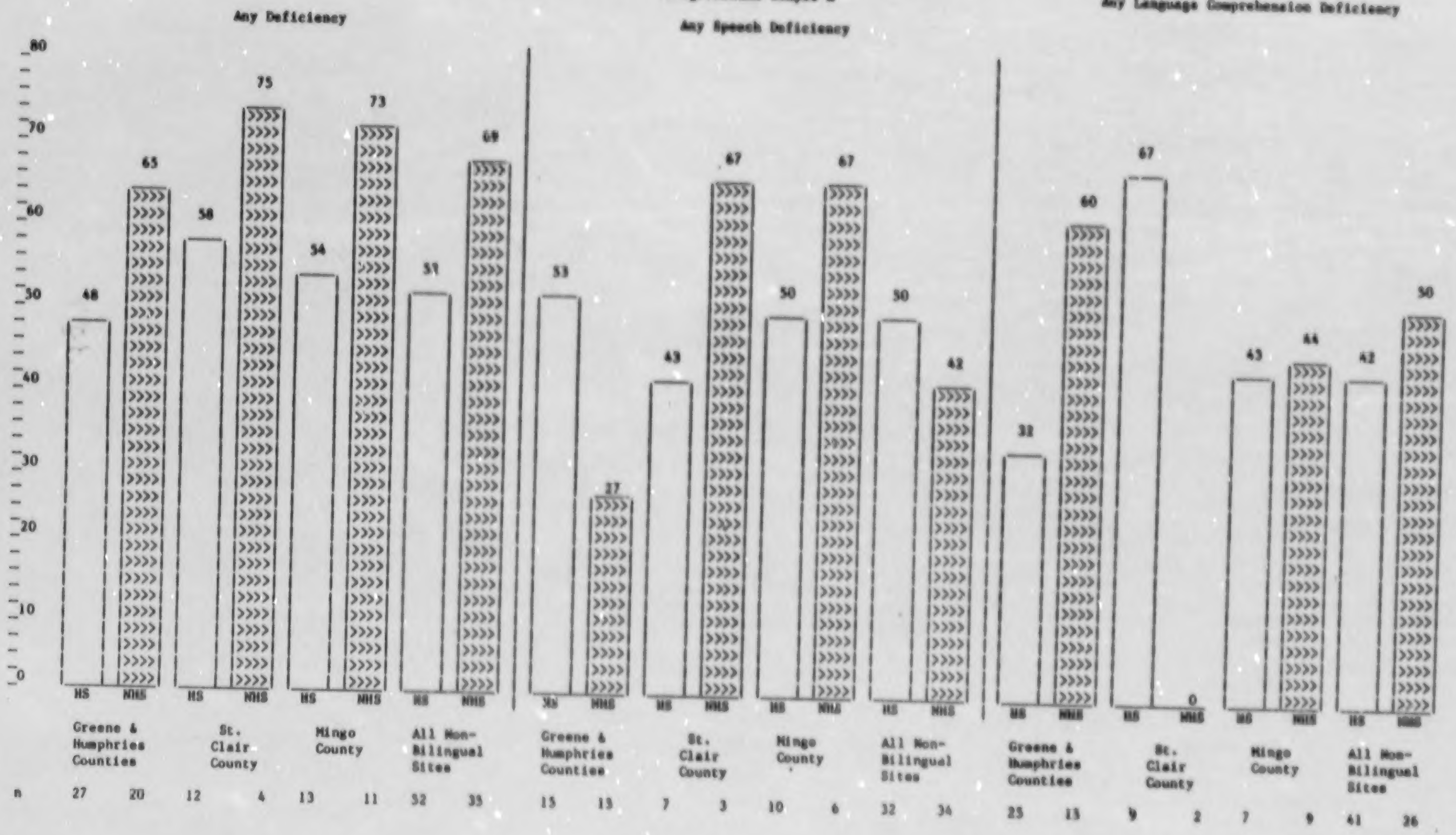
Speech and Language Services Received Through Sources Other than Head Start According to Mother's Report

		Posttested Children (Samples A, B, and C) in:				
		Greene or Humphreys Counties n=219	St. Clair County n=183	Maricopa County n=164	Mingo County n=223	All Sites n=789
Child received speech exam (n=789)	n %	14/219 6.4	8/183 4.4	17/164 10.4	21/223 9.4	60/789 7.6
Speech exam provided by source other than Head Start (n=54)	n %	0/14 0.0	3/8 37.5	1/17 5.9	5/21 23.8	9/60 15.0
Child received special speech training (n=626)	n %	8/52 15.4	1/188 0.5	13/165 7.9	5/221 2.3	27/626 4.3
Training provided by source other than Head Start (n=27)	n %	0/8 0.0	0/1 0.0	0/13 0.0	0/2 0.0	0/27 0.0

In addition, we compared the proportion of children in the longitudinal sample found to have potential speech and/or language development deficiencies at posttest. Results, presented in Exhibit 9-9, again suggest that prevalence of potential speech and/or language deficiencies is lower in the Head Start group ($p < .08$). With regard to specific types of problems, findings were not consistent from site to site, although they seem to confirm pretest/posttest results reported earlier. Results of regression analyses on language comprehension improvements by the longitudinal sample do not confirm hints of a Head Start impact alluded to above. (Results are presented in Table 9-11 and 9-12 in the Appendix.)

Exhibit 9-8

Proportion of Children with Potential Speech and Language Comprehension Deficiencies at Both Pretest and Posttest
Longitudinal Sample A



Any Deficiency

Any Speech Deficiency

Any Language Comprehension Deficiency

Exhibit 9-9

Proportion of Children with Speech and/or Language Comprehension Deficiencies at Posttest

Posttest Scores		Longitudinal Children (Sample A) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Any deficiency	n	15/39	13/25	8/19	8/14	7/27	4/12	8/16	8/13	38/101	33/64
	%	38.5	52.0	42.1	57.1	25.9	33.3	50.0	61.5	37.6	51.6
		p = 0.287		p = 0.393		p = 0.635		p = 0.534		p = 0.078	
Speech deficiency	n	11/37	5/24	4/19	7/14	5/26	1/11	6/14	6/11	26/96	19/60
	%	29.7	20.8	21.1	50.0	19.2	9.1	42.9	54.5	27.1	31.7
		p = 0.440		p = 0.081		p = 0.444		p = 0.561		p = 0.539	
Language comprehension deficiency	n	9/39	10/25	7/19	4/14	5/27	3/12	4/16	4/13	25/101	21/64
	%	23.1	40.0	36.8	28.6	18.5	25.0	25.0	30.8	24.8	32.8
		p = 0.248		p = 0.618		p = 0.644		p = 0.730		p = 0.261	

Exhibit 9-10

Proportion of Children with Possible Speech and Language Comprehension Problems

Speech and Language Comprehension Measures		Posttested Children (Samples A, B, and C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Any Deficiency	n	55/127	42/ 95	50/106	42/ 80	26/ 81	13/ 46	61/118	70/105	192/432	167/326
	%	43.3	44.2	47.2	52.5	32.1	28.3	51.7*	66.7	44.4	51.2
Speech											
DASE (Articulation)	n	30/122	18/ 91	25/104	18/ 75	6/ 76	3/ 41	24/108	35/ 92	85/410	74/299
	%	24.6	19.8	24.0	24.0	7.9	7.3	22.2*	38.0	20.7	24.7
PDQ (Speech Quality)	n	17/120	12/ 89	19/105	12/ 76	13/ 76	7/ 41	32/103	26/ 77	81/404	57/283
	%	14.2	13.5	18.1	15.8	17.1	17.1	31.1	33.8	20.0	20.1
Any Speech Deficiency	n	38/122	22/ 92	34/106	25/ 77	17/ 78	8/ 42	47/112	52/ 95	136/418	107/306
	%	31.1	23.9	32.1	32.5	21.8	19.0	42.0	54.7	32.5	35.0
Language Comprehension											
ACLC (Auditory)	n	25/127	28/ 94	24/105	25/ 79	7/ 79	3/ 46	19/116	15/ 99	75/427	71/318
	%	19.7	29.8	22.9	31.6	8.9	6.5	16.4	15.2	17.6	22.3
Fluharty (Expression)	n	12/126	14/ 95	13/106	12/ 80	13/ 79	5/ 44	16/118	28/105	54/429	59/324
	%	9.5	14.7	12.3	15.0	16.5	11.4	13.6*	26.7	12.6*	18.2
Any Language Comprehension Deficiency	n	32/127	33/ 95	31/106	30/ 80	16/ 81	5/ 46	25/118	37/105	104/432	105/326
	%	25.2	34.7	29.2	37.5	19.8	10.9	21.2*	35.2	24.1*	32.2

*Group differences are statistically significant (p = < .05).

Cross-sectional Analyses. In the cross-sectional sample (A, B, and C), the proportion of children with possible speech and/or language comprehension problems was compared between the Head Start and non-Head Start groups. As illustrated in Exhibit 9-10, prevalence of any potential deficiency was somewhat lower in the Head Start group. This is primarily due to a significantly lower proportion of Head Start children identified as having language comprehension problems ($p < .05$); group differences were evident for speech deficiencies.*

Closer examination of the data and the particular problems children experienced shows some differences among sites. In two sites--St. Clair and Mingo Counties--the prevalence of speech dificiencies at both time points was lower for the Head Start group. The trend was reversed in Greene and Humphreys Counties. This finding is puzzling at first because Mingo County Head Start screened such a small proportion of enrolled children, as noted in Exhibit 9-7. Speech and language comprehension services are scarce or nonexistant in this area. In response, Head Start contracted with a speech pathologist from another community to provide needed services and to to train Head Start classroom staff to screen and provide remedial services. In fact, a detailed manual was prepared for use by teachers to ensure services would be delivered to children in need, ever after the retirement of the speech pathologist. Head Start's emphasis on teacher training clearly paid off in this site. It is a model that may be replicable in other communities experiencing difficulties arranging for speech and language development services.

Regression analyses confirmed these Mingo County findings: Head Start was significantly associated with higher scores in the DASE with fewer potential problems (Results are presented in Table 9-13 in the Appendix). The regression analyses also indicated that Head Start children in Greene and Humphreys Counties received higher scores in the three-critical-elements portion of the ACLC. The few significant Head Start effects that were found (42 regression analyses-for seven dependent variables in six-site combinations) might be due to chance. Moreover, the non-Head Start group in

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*There is some question about the reliability of the pre/posttest findings As shown in Table 9-12 in the Appendix, approximately 20 percent of the children with no deficiencies at pretest were found to have potential problems at posttest.

St. Clair county performed better in sentence repetition (Fluharty) than the Head Start children.*

The picture is somewhat different with regard to language comprehension problems. In Greene and Humphreys Counties, the only full-day Head Start program in the study, there is evidence of a possible Head Start effect in remediating language comprehension problems. [Group differences approached significance (p = .08).] This may suggest that full-day programs are more effective in remediating such problems, probably because children spend more time in the classroom. A similar trend was not found in any of the other sites; in fact, it was reversed in St. Clair County (where the number of children in the Head Start on non-Head Start group was extremely small).

Conclusions

In general, there was high agreement between results of the Head Start Health Evaluation and those of the Head Start program on the presence of potential speech and language comprehenion problems requiring professional diagnostic services. Analyses indicated that there is a high prevalence of potential speech and/or language comprehension problems (2 out of 3 children) before children are eligible to enter Head Start. However, only a third of the Head Start children in the posttest sample were screened for speech problems, and of those, one in five received a formal speech assessment and only 27 received services. Thus, it is not surprising that subsequent descriptive and regression analyses provided little evidence of a consistent Head Start effect.

Head Start children in the longitudinal sample who had a speech and/or language comprehension problem at pretest had fewer problems at posttest than did non-Head Start children; however, sample sizes for this analysis were small (87 children across all sites) and the differences were not statistically significant. Regression analyses indicated two areas in which Head Start may have had a significant effect. Head Start children in Greene and Humphreys Counties, the only site with a full-time (5 days/week, 6 hours/day) program, had higher scores on the 3-critical elements component of the ACLC

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*Tables 9-14 through 9-19 present unadjusted comparison data between the Head Start and non-Head Start groups by site and age group for all speech and language comprehension measures.

($p < .05$) and Head Start children in Mingo County, which provided special training to Head Start classroom staff to help them provide speech services, had higher scores on the DASE and fewer speech problems ($p < .05$).

Thus, there is evidence that, even in the absence of comprehensive services, full day programs may be more successful in improving children's language comprehension. Moreover, it appears that Head Start classroom staff can be trained to be aware of articulation problems and to encourage children to speak more clearly. These findings, though limited to single programs, may be useful for all of Head Start, especially in areas where it is difficult to provide specialized speech services.

CHAPTER TEN

VISION EVALUATION

Vision Indicators

Many researchers believe that early detection of vision problems is an important indicator of possible later academic problems (particularly as regards reading). "If vision is poor", the American Optometric Association's Optometric Preventive Health Care Project Team's report states, "chances of success in the classroom are also poor" (American Optometric Association, 1980). Other researchers agree, though the opposite--that children who do well on vision perception tests also do well in reading achievement--cannot be clearly supported (Pierce, 1977).

With early detection of vision problems, treatment is possible; "early diagnosis and treatment can help prevent or reduce their impact on learning" (American Optometric Association, 1980). Myopia, for instance, in children past their first birthday should be corrected to prevent perceptual, intellectual or psychological problems (Woodruff, 1975). Similarly, prevention of amblyopia and strabismus must be attempted as early as possible during the visual development (Backman, 1978). To detect and treat these conditions, professional visual examinations are recommended within the first six months of life. (Backman, 1978). In general, "prevention [of visual problems] is maximized when the population 'at risk' can be identified at the earliest time. . . (Woodruff, 1975).

A comprehensive vision examination was administered as part of the Head Start Health Evaluaton to assess the presence of actual or potential vision system impairment in each of the children. The vision exam occurred in a room that could be darkened and in which the lighting could be easily controlled by the examining optometrist. Several testing aides were used in the exam--a slide projector showing a cartoon for the pursuit test which assesses binocular integration, and slides showing a hand of different sizes which could be rotated for the visual acuity test.

The study employed two optometrists to collect the vision data across the four sites. These optometrists were selected because of their extensive experience in collecting vision data on young children in their private practices. One optometrist collected the vision data in Greene and Humphreys Counties and Maricopa County while the other collected the same data from St. Clair and Mingo Counties.

From the examination, seven variables were constructed for use in analyses. The variables document whether a child passed various portions of the examination; i.e. the examination determined presence or absence of a given problem. Each variable is described briefly in Exhibit 10-1.

It is important to note that the examinations for stereopsis, binocular integration, and visual acuity frequently did not produce reliable results because the children were too young to follow the instructions of the examiners. Hence prevalences of some deficiencies detected in the vision evaluation were related to age. Most of the unreliable data in the stereo acuity and binocularity tests come from children below 3.25 years of age. When the youngest children could respond to the examination, they generally passed it. Unidentified unreliability may account for some percentage of children who appear to be deficient in these areas.

The vision data were used to investigate four research questions:

- What is the prevalence of vision problems in Head Start and comparison children?
- What vision services do Head Start children receive?
- Do children receive vision services through sources other than Head Start?
- What are the impacts of the Head Start program with regard to remediation of the vision problems of Head Start participants?

The analytic techniques that were employed to address the research questions and the results of these analyses are described below.

Analysis of the Vision Data

Four types of analyses were undertaken to investigate vision status and services for Head Start and non-Head Start children. First, the distribution of the dependent variables was examined for outliers. No suspect data points were identified.

Exhibit 10-1

Definitions of Vision Evaluation Measures

Measure	Definition
Ocular-Motility	(Eye Movement Control) Ability to maintain fixation on a moving target and/or the ability to accurately fixate on various targets. This skill allows easy shifting of the eyes along the lines of print in a book, a speedy and accurate return to the next line, effective scanning of vertical columns, and quick and accurate shift from desk to chart or chalkboard and vice versa.
Strabismus	A type of inadequate eye teaming performance where both eyes are unable to simultaneously direct their gaze at the same point in space. This may occur intermittently, constantly, or alternating.
Convergence	Ability of the eyes to simultaneously direct gaze at the same near target in space.
Retinoscopy	A diagnostic method of determining the refractive error of the eye, hyperopia, myopia, or presence of astigmatism. A prescription for glasses can then be determined.
Visual acuity	The measurement of sharpness of sight. For example, 20/20 means that a target approximately 5/16ths of an inch in height was recognized at 20 feet.
Stereopsis	(Central depth perception) Ability to perceive three-dimensionality. This skill allows effective craft inspection, superior judgment of "me-it" relationships in athletic endeavors, sureness security in general movement.
Binocular Integration	(Eye teaming ability) This visual skill allows simultaneous alignment and inspection for accurate and immediate symbol and object awareness. Difficulty in matching right and left eye fields may result in strabismus (one eye turns in or out), suppression (blocking out of the vision of one eye) and/or, task rejection (day-dreaming, avoidance behavior, etc.).

Second, contingency-table analyses were used to compare the prevalence of vision problems among Head Start-eligible children. In the longitudinal sample, we examined what proportion of the children were determined to have vision problems at both pretest and posttest, as well as the proportion of children who had received remedial services through Head Start.

Third, regression analyses were run to examine the impact of Head Start in remediating seven vision problems: ocular-motility, strabismus, convergence, retinoscopy, visual acuity, stereopsis, and binocular integration. The analyses entered the variables in a fixed sequence into the regression model: first, all of the covariates, then the three effects-coded site variables, and finally the Head Start variable. After considering a variety of potentially important covariables (age, gender, race, per capita income, family employment status, and mother's education) and including only those that were significantly associated with at least three dependent variables, the final covariate set included:

- child's gender;
- child's race (black vs. non-black);
- mother's education.
- pretest score (longitudinal analyses).

Regressions were run for both the longitudinal and the cross-sectional samples of children.

Summary of Findings

Prevalence of Vision Problems

Percentages of children who were found to have vision problems at pretest are presented in Exhibit 10-2. Across the four sites, 61 percent of the children were diagnosed to have one or more vision deficiencies. The most commonly identified problems were in the areas of stereo acuity, ocular-motility, stereopsis,* and binocular integration.* There were no important differences in prevalence of problems between males and females.

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*These estimates may be unreliable, as noted previously, particularly for young children who had difficulty following the instructions of examiners.

Exhibit 10-2

Prevalence of Vision Problems in Head Start-Eligible Children at Pretest

Vision Problem		Pretest Children (Samples A & D) in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
Any Deficiency	n	39/95	83/113	58/95	49/73	229/376
	%	41.1	73.5	61.1	67.1	60.9
Ocular-Motility	n	29/95	65/109	44/95	33/73	171/372
	%	30.5	59.6	46.3	45.2	46.0
Stereopsis	n	11/90	20/81	11/90	14/60	56/321
	%	12.2	24.7	12.2	23.3	17.4
Binocular Integration	n	1/85	14/93	16/93	22/58	53/329
	%	1.2	15.1	17.2	37.9	16.1
Strabismus	n	2/94	14/108	9/93	6/70	31/365
	%	2.1	13.0	9.7	8.6	8.5
Convergence	n	4/94	12/108	9/92	9/70	34/364
	%	4.3	11.1	9.8	12.9	9.3
Retinoscopy						
Hyperopia	n	3/89	7/107	8/93	11/70	29/359
	%	3.4	6.5	8.6	15.7	8.1
Myopia	n	0/89	4/107	1/93	0/70	5/359
	%	0	3.7	1.1	0	1.4
Astigmatism	n	1/89	13/107	12/93	3/70	29/359
	%	1.1	12.1	12.9	4.3	8.1
Visual Acuity (≤ 20/40)	n	3/89	5/107	4/93	2/70	14/359
	%	3.4	4.7	4.3	2.9	3.9

There was considerable variation in the prevalence of vision deficiencies across the four sites. Using all of the vision evaluation measures, three out of four children in St. Clair County was diagnosed to have one or more vision deficiencies. In contrast, only 41 percent of the children in Greene and Humphreys Counties fell into this category; this site had the lowest prevalence of vision problems. There also were differences in the types of vision deficiencies that were diagnosed. Problems with ocular-motility, stereopsis, strabismus, myopia and visual acuity were more common in children in St. Clair County than in the other three sites. Mingo County children, on the other hand, were more likely to have problems with binocular integration, convergence and hyperopia.

Comparisons of vision problems among Head Start and non-Head Start children at pretest indicate only one statistically significant difference (among the 50 chi-squared tests that were calculated): Head Start children in Greene and Humphreys Counties had more stereo acuity problems than did non-Head Start children ($p < .05$). However, there was no evidence that children in Head Start had a higher incidence of vision problems.

Published national reference data on vision performance for children aged three to five years do not exist. However, a recent statement by the American Academy of Ophthalmology to the Select Panel on the Promotion of Child Health (American Academy of Ophthalmology, 1981, Vol. 1, p. 28) reported that as many as 20 percent of American children of all ages suffer from visual acuity problems and an additional 5 to 7 percent have some form of eye disease. The National Health Examination Survey of 1963-65 also described the prevalence in children of certain vision deficiencies, particularly deficiencies in visual acuity, color discrimination, and phoria. However, the children in this survey were six years of age and older, so that survey results are not necessarily comparable to those obtained in the Head Start Health Evaluation. Nonetheless, the above prevalence data suggest that the level of vision deficiencies in study children (4% overall visual acuity prevalence) is considerably lower than that recently reported by the Select Panel for the Promotion of Child Health. However, when all problems are included, the proportion of children with problems is significantly higher. The data suggest preschool chldren need vision examinations so that problems can be identified and treatments begun, despite the difficulties of assessment for young children.

Vision Services Provided through Head Start

Head Start health records provide information about whether Head Start children received a vision screen after entering Head Start, whether any problems were found and, if there were findings, whether Head Start provided treatment or a referral. As shown in Exhibit 10-3, slightly over half of the children across the four sites had received a vision screen according to the Head Start health records. Of the screened children, one out of ten were diagnosed to have a vision deficiency by more indepth testing. This finding is puzzling at first when compared to prevalence rates of vision problems reported earlier. The discrepancy is explained by the fact that Head Start screens only for visual acuity problems and obvious strabismus; no comprehensive vision screens are done on the children. Prevalence of these types of vision problems reported in Head Start health records is thus comparable to that found in the Head Start Health Evaluation. Less than one-third of the children identified by Head Start to have vision problems were referred for or received treatment.

Some Head Start programs did notably better than others in getting children screened for vision problems and arranging for more indepth testing and treatment services for those diagnosed to have a problem. Almost all children in Maricopa County received a vision screen, but only 13 percent of the children were referred for or received remedial treatment. St. Clair County Head Start referred no children for treatment. In contrast, Mingo County Head Start screened only one out of three children, but provided follow-up care to all children with vision problems (usually through assistance from the Lions Club). There also were some differences from site to site in the proportion of children whose records indicated a vision problem. The presence of problems was highest in Maricopa County (16%) and lowest in St. Clair County (4%).

We checked to see whether findings reported in the Head Start health records were in agreement with results of the Head Start Health Evaluation vision exam. Results are presented in Table 10-1 in the Appendix. Overall, there was agreement on only one-third of the children who were diagnosed to have vision problems. The Head Start vision screens turned up a substantial number (66%) of "false positives"--children deemed to have problems who according to the more comprehensive exam were found not to have any deficiencies. Given that the initial screen was conducted by a paraprofessional, this may be a reasonable rate of overreferral. On the other hand, the Head Start vision screens resulted in 7% false negatives--children needing services who were mistakably declined.

Exhibit 10-3

Vision Services Provided by Head Start According to Head Start Health Records

		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=102	Mingo County n=112	All Sites n=449
Received Vision	n	52/127	50/108	101/102	36/112	239/449
Screen	%	40.9	46.3	99.0	32.1	53.2
Significant	n	5/52	2/50	16/101	3/36	26/239
Findings on Screen	%	9.6	4.0	15.8	8.3	10.9
Treatment/Referral	n	3/5	0/2	2/16	3/3	8/26
Provided	%	60.0	0	12.5	100.0	30.8

These false screening results are a direct result of the way in which Head Start screens children. In all sites paraprofessional staff are used to do vision screens, rather than optometrists or opthamologists. Even though Head Start staff have received special training in vision screening, results of their screens are frequently incorrect. Consideration should be given to increasing the use of professionals to perform vision screens and to increasing the proportion of children screened. A number of vision problems currently go undiagnosed, which can have detrimental effects on children's educational attainment in Head Start and their later achievement in school. Consideration should also be given to improving the reporting mechanism for Head Start vision screens. As discussed in Chapter Two, the Program Information Record (PIR) is not a satisfactory tool. Despite the PIR instructions, the reported completion rates of "medical screens" are actually "medical examinations." The other medical screens, and their actual low rates of performance are not reported.

The prevalence of vision deficiencies was high: 61 percent of the children were diagnosed to have one or more vision problems at pretest. Data collected at posttest suggest that the pretest data overestimate prevalence of such problems by almost a factor of two, in part because optometrists encountered difficulties testing young children.

These comments indicate a need for Head Start to educate parents about the importance of remedial services for vision problems and the implications of withholding them in terms of the child's future. In addition, Head Start staff should follow-up with parents to ensure that needed services are obtained.

Vision Services Provided through Sources Other than Head Start

In the medical history interview, mothers in both Head Start and non-Head Start groups were asked whether their child had ever had a vision examination or vision therapy for various types of vision problems. According to these reports shown in Exhibit 10-4, across the four sites, 40 percent of the Head Start and 10 percent of the non-Head Start children had ever been screened for vision deficiencies. Vision exams for Head Start children, provided by a source other than Head Start were most common in Greene and Humphreys Counties, for over one-third of the Head Start children examined. In contrast, only 14 percent of the Head Start children examined in Mingo County received this examination outside of Head Start. Virtually all non-Head Start children examined received that examination through some other source. Within all sites, Head Start children received significantly more vision examinations.

Impacts of Head Start's Vision Services on Remediation of Children's Vision Problems

Longitudinal Analyses. Exhibit 10-5 shows the proportion of children in the longitudinal sample (A) diagnosed to have any vision deficiencies at posttest. Data are presented by two definitions: one resulting from the comprehensive vision examination of the Head Start Health Evaluation and

Exhibit 10-4

Vision Services Provided through Sources Other than Head Start According to Mothers' Report

Vision Services		Posttested Children (Samples A,B, and C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
Received Vision Examination	n %	46/121 38.0	12/98 12.2**	44/105 41.9	4/84 4.8**	38/91 41.8	7/59 11.9**	42/113 37.2	10/108 9.3**	170/430 39.5	33/349 9.5***
Examination Provided by Non-Head Start Source	n %	16/46 34.8	12/12 100.00	12/44 27.3	4/4 100.0	11/38 28.9	7/7 100.0	6/42 14.3	10/10 100.0	45/170 28.7	33/33 100.0***
Vision Therapy Recommended for Stabismis	n %	2/7 28.6	0/3 0.0	2/5 40.0	0/3 0	1/4 25	0/1 0	1/4 25.0	3/9 33.3	6/20 30.0	3/16 18.8
Vision Therapy Provided by Non-Head Start Source	n %	0 0	0	1/1 100.0	0	0	0	0	1/1 100.0	1/3 33.3	1/1 100.0

*p < .05
**p < .01
***p < .001

Exhibit 10-5

Proportion of Children with Vision Deficiencies at Posttest

Vision Measures		Longitudinal Children (Sample A) in:									
		Greene & Humphrey s Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Any Deficiency (Head Start Health Evaluation Definition)	n %	8/ 43 18.6	6/ 31 19.4	7/ 25 28.0	6/ 16 37.5	19/ 40 47.5	11/ 16 68.8	4/ 18 22.2	6/ 17 35.3	38/126 30.2	29/ 80 36.3
		p = 0.935		p = 0.524		p = 0.150		p = 0.630		p = 0.363	
Any Deficiency (Head Start Definition)	n %	2/ 43 4.7	2/ 31 6.5	2/ 25 8.0	1/ 17 5.9	6/ 40 15.0	2/ 16 12.5	2/ 18 11.1	2/ 17 11.8	12/126 9.5	7/ 81 8.6
		p = 0.735		p = 0.794		p = 0.809		p = 0.952		p = 0.830	
Child Received Vision Exam	n %	20/ 43 46.5	16/ 30 53.3	16/ 24 66.7	13/ 17 76.5	25/ 38 65.8	12/ 16 75.0	13/ 17 76.5	13/ 18 72.2	74/122 60.7	54/ 81 66.7
		p = 0.566		p = 0.497		p = 0.506		p = 0.774		p = 0.385	

the other coinciding with vision problems that Head Start screens for visual acuity and obvious strabismus. There was a significant drop in the prevalence of vision problems according to the Head Start Health Evaluation definition from 61 percent at pretest for both groups to 30 percent in the Head Start and 36 percent in the non-Head Start group across the four sites. Prevalence of vision deficiencies according to Head Start's definition, however, remained virtually unchanged. The decrease in prevalence in all likelihood was caused by unreliable pretest data on some vision measures, particularly for very young children, as discussed earlier in this chapter. This is supported by data presented in Table 10-2 in the Appendix, which shows that 50 percent of the Head Start and 79 percent of the non-Head Start children diagnosed to have a vision deficiency at pretest were not found to have problems at posttest. It is highly unlikely that an actual decrease in vision problems occurred because, unlike with other health problems, they are difficult to remedy. Even if glasses were prescribed and the child was wearing them, a vision problem still probably would have been noted for the child.

In all sites, the proportion of children with any deficiency (according to our definition) was lower for the Head Start than non-Head Start group at posttest. Group differences were not statistically significant, however, either across or within sites. A similar trend was not evident with regard to vision deficiencies defined by Head Start which showed inconsistent results from site to site. Thus, there appears to be no positive Head Start effect.

Cross-sectional Analyses. The proportion of vision deficiencies diagnosed at posttest in the cross-sectional sample is presented in Exhibit 10-5. Approximately one-third of the children in both the Head Start and non-Head Start groups were found to have vision deficiencies. Children in Maricopa County were much more likely to have vision problems than children in the other three sites. The profile of vision deficiencies found is similar to those presented for the pretest sample (see Exhibit 10-2). Problems with binocular integration, ocular-motility and stereopsis were most common in both groups of children.* A series of regression analyses were

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*Tables 10-3 and 10-4 in the Appendix provides more detailed information on vision problems of children in the cross-sectional sample.

Exhibit 10-6

Prevalence of Vision Deficiencies at Posttest[a]

Vision Deficiencies		Posttested Children (Samples A, B, and C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
Any deficiency	n %	34/127 26.8	24/ 99 24.2	30/106 28.3	27/ 83 32.5	55/106 51.9	37/ 60 61.7	25/118 21.2	29/105 27.6	144/457 31.5	117/347 33.7
Ocular Motility	n %	4/127 3.1	4/100 4.0	37/105 35.2	24/ 84 28.6	15/104 14.4	9/ 60 15.0	44/118 37.3	37/105 35.2	100/454 22.0	74/349 21.2
Stereopsis	n %	24/127 18.9	8/ 95 8.4*	27/101 26.7	16/ 76 21.1	15/106 14.2	9/ 60 15.0	23/111 20.7	22/102 21.6	89/445 20.0	55/333 16.5
Binocular Integration	n %	32/127 25.2	20/ 85 23.5	18/105 17.1	22/ 80 27.5	36/104 34.6	30/ 60 50.0	31/113 27.4	24/ 99 24.2	117/449 26.1	96/324 29.6
Strabismus	n %	7/127 5.5	13/100 13.0*	5/106 4.7	9/ 84 10.7	16/106 15.1	10/ 60 16.7	7/119 5.9	6/106 5.7	35/458 7.6	38/350 10.9
Convergence	n %	2/127 1.6	3/100 3.0	11/106 10.4	8/ 84 9.5	2/106 1.9	2/ 60 3.3	9/119 7.6	7/105 6.7	24/458 5.2	20/349 5.7
Retinoscopy											
Hyperopia	%	1/126 0.8	1/ 97 1.0	9/105 8.6	1/ 80 1.3*	6/104 5.8	2/ 60 3.3	11/115 9.6	10/102 9.8	27/450 6.0	14/339 4.1
Astigmatism	n %	3/127 2.4	6/101 6.0*	16/106 15.1	12/ 84 14.3	13/106 12.3	11/ 61 18.0	6/109 5.5	12/ 96 12.5	38/448 8.5	40/347 11.6
Visual Acuity	n %	2/125 1.6	1/ 91 1.1	3/ 93 3.2	2/ 66 3.0	1/104 1.0	1/ 59 1.7	4/105 3.8	5/ 91 5.5	10/427 2.3	9/307 2.9

[a] Significance indicated as * for p < .05.

performed to determine whether differences between the Head Start and non-Head Start groups were statistically significant. Results of these analyses (presented in Tables 10-5 and 10-6) showed only one significant difference (most likely due to chance): Head Start children in Greene and Humphreys Counties were more often deficient in stereopsis than non-Head Start children in that site.

Conclusions

The prevalence of vision deficiencies was high: 61 percent of the children were diagnosed to have one or more vision problems at pretest. There are strong indications that these pretest figures overestimate prevalence of such problems by almost a factor of two, in large part because examining optometrisits encountered difficulties with young children.

Head Start is instrumental in providing vision screens for enrolled children. Almost four times as many Head Start as non-Head Start children had ever been screened. Some Head Start programs did notably better than others in getting children screened and arranging for treatment.

There is room for considerable improvement in all of the sites. Discrepancies were found between the results of the Head Start Health Evaluation exam and findings reported in the Head Start health records in terms of children diagnosed to have visual acuity problems or obvious strabismus (which is what Head Start screens are designed to detect), in part because all sites rely on paraprofessionals to do the screens. As a result, vision problems of a number of children, which can have a detrimental effect on children's educational attainment, go undiagnosed. There was no evidence that the screens provided by Head Start lowered the prevalence of vision problems or that more Head Start than non-Head Start children received needed treatment for vision problems. However, according to the results of this evaluation, three- and four-year-olds may have more vision problems than previously suspected.

CHAPTER ELEVEN

HEARING EVALUATION

Hearing Indicators

A major challenge to the Head Start Health Evaluation was to collect reliable hearing data on children aged three to six. Collecting hearing data on children of this age requires reliability in both procedures and equipment. Children can fail hearing evaluations for many reasons, including lack of cooperation and maturational ability. Because skill and experience with testing young children were considered essential, experienced audiologists from Children's Hospital of Pittsburgh and the University of Pittsburgh School of Medicine conducted the hearing evaluation.

Reliable equipment which was transportable was also a major issue for the hearing evaluation. For purposes of the evaluation, it was important to be able to distinguish between equipment unreliabilty and hearing impairment associated with upper respiratory infections and otitis media. Therefore, the hearing evaluation combined audiometric testing at four frequency levels (500, 1000, 2000, and 4000 Hz) and tympanometry, in conjunction with a pediatric evaluation that assessed the presence of serous or recurrent otitis media. The dependent variables that emerged from these evaluations are described briefly in Exhibit 11-1.

The hearing evaluation aimed to describe the health status of the children in terms of past and present hearing deficiencies. The hearing evaluation for the Head Start Health Evaluation was designed to address the following questions:

- What is the prevalence of hearing problems in Head Start - eligible children?
- What hearing services do Head Start children receive through Head Start?
- Do children receive hearing services through sources other than Head Start?
- What are the impacts of Head Start in remediating hearing problems of Head Start children?

Analyses and findings for each of these questions are described below.

Exhibit 11-1

Hearing Measures

Variable	Description
Audiometry	
Hearing deficiency in speaking range	Failure in either ear at 500 Hz (25 dB threshold), 1000 Hz (20 dB threshold), or 2000 Hz (20 dB threshold)
Hearing deficiency at 4000 Hz	Failure in either ear at 4000 Hz (25 dB threshold)
Tympanometry	
Deficiency in middle-ear impedance	Failure in tympanometry examination in either ear; that is, the tympanometric chart gives no evidence of peak in at least one ear.
Otitis Media	Pediatric examination showed evidence of serous or recurrent otitis media.
Audiometry and Tympanometry	Failure in either ear at 500 Hz (25 dB threshold)...and tympanometric chart gives no evidence of peak in same ear.
Audiometry and Serous or Recurrent Otitis Media	Failure in either ear at 500 Hz (25 dB threshold), and clinical assessment of serous or recurrent otitis media
Audiometry, Tympanometry, and Serous or Recurrent Otitis Media	Failure in either ear at 500 Hz (25 dB threshold), and tympanogram failure in same ear and no clinical assessment of serous or recurrent otitis media
Audiometry Failure in Both Ears	Failure within speaking range in both ears at either pretest or posttest

Analyses of Hearing Data

The hearing evaluations were analyzed to determine the prevalence of hearing deficiency of each type within each site. The percentage of children who had a hearing deficiency in the speaking range, a hearing deficiency at

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4000 Hz, a middle-ear impedance failure, and/or a history of otitis media was determined. The prevalence figures do not include data for children with incomplete test results on a particular hearing measure. Therefore, because children with a deficiency are likely to have more incomplete data, the estimates of hearing problems are probably conservative.

Relationships between background variables, hearing problems, and Head Start services were investigated using multiple regression techniques. The final regression model included the following covariates:

- child's age
- child's gender
- child's race (black vs. non-black)
- mother's education, and
- family's employment status.

The covariables associated with at least three of the dependent variables in either the across- or within-site analyses were included. Analyses were structured to enter the variables into the regression model in a fixed sequence: first all of the covariates, then the three effects-coded site variables, and finally the Head Start variable.

Site differences were estimated using effects-coded site variables. Regression analyses examined the six major dependent variables (hearing loss in the speaking range; hearing loss at 4000 Hz; tympanogram; otitis media; hearing loss and tympanogram failure; hearing loss and otitis media).

Analyses of service data used contingency table analyses and chi-squared tests to investigate differences in hearing services provision to Head Start and comparison children and to special groups of children within Head Start. Because little services data were available, these analyses were limited in scope.

Summary of Findings

Prevalence of Hearing Problems

The prevalence of hearing problems in the children evaluated at pretest, as shown in Exhibit 11-2, was high. Almost one-third of the children were diagnosed as having some level of hearing loss; 14 percent had otitis media; and 4 percent had both otitis media and hearing loss. Caution should be used, however, in interpreting these prevalence data.

The pretest data may overstate the magnitude of hearing problems, particularly with regard to hearing loss, by as much as a factor of three. The Select Panel for the Promotion of Child Health (1981, Vol. 1, p.28) estimates that approximately 10 percent of all children have a hearing deficit. Their estimate is quite similar to prevalence data obtained in the Head Start Health Evaluation posttest. (Results of these analyses are presented in a later section of this Chapter.) These prevalence rates particularly at pretest, do suggest an expected rate of test failure for children of this age group. They may not, however, provide a reliable estimate of rates of hearing loss in these children.

The differences in terms of hearing problems between pretest and posttest were investigated thoroughly. In large part, they appear to be attributable to the young age of children at the time of pretest examination. No national study has ever studied or reported hearing levels of children less than six years of age because it is difficult to obtain complete or reliable data on younger children. (The Health Examination Survey of 1963-65 which tested hearing levels of adults and children six years or older reported a high incidence of missing or unreliable data for six- and seven-year olds.) At pretest, a large number of children failed the hearing evaluation because of their inability or unwillingness to respond appropriately to the testing situation.

There was considerable site-to-site variation in prevalence rates of hearing problems at pretest. Children in Greene and Humphreys Counties and in Mingo County consistently failed the audiometry and tympanometry tests more frequently than did children in St. Clair or Maricopa Counties. Prevalence rates were not associated with the gender of the child. However, significant racial differences emerged for the tympanometry: failures of white children were over twice the rate of both black and Hispanic children.

Exhibit 11-2

Prevalence of Hearing Problems for Head Start-Eligible Children

Hearing Problems		Pretested (Samples A and D) Children in:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
Any Hearing Loss	n	40/79	18/99	26/90	22/58	106/326
	%	50.6	18.2	28.9	37.9	32.5
Hearing Loss in Speaking Range (500, 1000, 2000 Hz)	n	34/72	14/97	21/86	17/48	86/303
	%	47.2	14.4	24.4	35.4	28.4
Hearing Loss at 4000 Hz	n	24/74	7/97	12/88	8/52	51/311
	%	32.4	7.2	13.6	15.4	16.4
Deficiency in Middle-Ear Impedance	n	36/80	28/107	15/92	27/67	106/346
	%	45.0	26.2	16.3	40.3	30.6
Otitis Media[a]	n	13/95	15/112	13/93	12/73	53/373
	%	13.7	13.4	14.0	16.4	14.2
Hearing Loss and Deficiency in Impedance	n	18/67	8/95	6/86	9/44	41/292
	%	26.9	8.4	7.0	20.5	14.0
Hearing Loss and Otitis Media	n	4/73	1/96	5/87	3/48	13/304
	%	5.5	1.0	5.7	6.3	4.3

[a] Combination of prevalence of serous otitis media and recurrent otitis media (see Exhibit 3-2).

Hearing Services Provided Through Head-Start*

The Head Start Performance Standards state that the "health screening shall include . . . . hearing testing [and] treatment and followup services [should be obtained] . . . for all problems detected." Data were obtained from Head Start health record abstracts following the posttest evaluation concerning hearing tests, deficiencies detected, and referrals for or treatment of deficiencies. Data are presented in Exhibit 11-3.

Across the four sites, 61 percent of the Head Start children received tests for hearing deficiencies, although this varied tremendously from site to site. Head Start programs in Maricopa and Mingo Counties tested almost all of the enrolled children. In contrast, only 37 percent of children in Greene and Humphreys Counties and approximately half of the children in St. Clair were tested. St. Clair is the only site in which a considerable proportion of the hearing tests were conducted prior to Head Start entry. The test was part of a health examination which children are required to obtain before Head Start enrollment in that program. Only ten percent of the children were diagnosed as having hearing problems, according to the records. Almost all of these children were referred for treatment, except in St. Clair County where no referrals were made.

The posttest findings of the Head Start Health Evaluation indicate that the Head Start hearing tests detected many of the same children to have hearing problems (see Table 11-1 in the Appendix).

Impacts of Head Start on Remediation of Children's Hearing Problems

Longitudinal Analyses. A very limited set of analyses were conducted on the longitudinal sample (A) to determine whether Head Start had an impact on remediation of hearing problems, in large part because the pretest data were deemed to overestimate prevalence of such deficiencies. A comparison of the proportion of children with hearing problems at both pretest and posttest and those with an incidence of hearing problems between pretest and posttest is shown in Exhibit 11-4. The majority of children for whom

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*No data are available about hearing tests/services provided to non-Head Start children or to Head Start children through non-Head Start sources.

Exhibit 11-3

Hearing Services Provided by Head Start According to Head Start Health Records

Hearing Services		Posttest Head Start Children (Samples A, B, C) in:				
		Greene & Humphreys Counties n=127	St. Clair County n=108	Maricopa County n=102	Mingo County n=112	All Sites n=449
Received Test	n	45/127	45/108	10/102	84/112	275/449
	%	35.4	41.7	99.0	75.0	61.2
Significant Hearing Findings	n	3/45	2/45	12/101	10/84	27/275
	%	6.7	4.4	11.9	11.9	9.8
Hearing Referral for Treatment	n	3/3	0/2	9/12	10/10	22/27
	%	100.0	0.0	75.0	100.0	81.5

Exhibit 11-4

Percentages of Children in Longitudinal Sample (Sample A) who Failed Posttest and Either Failed or Passed Pretest

Hearing Problem	Failed Posttest/ Failed Pretest	Failed Posttest/ Passed Pretest
Hearing loss in either ear within speaking range	6/48 12.5	9/121 7/4
Failure on tympanometric examination of either ear	12/57 21.1	4/124 3.2
Hearing loss at 500 Hz and serous or recurrent otitis media	1/9 11.1	2/160 1.3
Failure on tympanometric examination and hearing loss at 500 Hz	1/21 4.8	7/132 5.3
Serous or recurrent otitis media	8/30 26.7	10/176 5.7
Any deficit in speaking range	9/60 15.0	11/122 9.0

problems were noted at pretest were not found to have problems at posttest (Table 11-2). However, children with problems at posttest more often also had been diagnosed as having problems at pretest. (This finding suggests that error in the pretest was largely in the direction of false positives rather than false negatives.) Reductions in hearing loss are clinically not possible; yet there was a significant decrease in such deficiencies from pretest to posttest.

Cross-Sectional Analyses. Information concerning hearing deficiencies of children in the cross-sectional sample are presented in Exhibit 11-5 and Tables 11-2 through 11-4 in the Appendix. Only 12 percent of the children in both the Head Start and non-Head Start group were diagnosed to have any hearing loss. Deficiencies in middle-ear impedance or the presence of otitis media was about the same for both groups of children. With the exception of lower prevalence of middle-ear impedance in the non-Head Start group in Maricopa County, none of the group differences were statistically significant. Results of regression analyses (reported in Table 11-5) confirm that Head Start did not have an effect on any hearing outcomes, with the possible exception of provision of hearing screens and treatment on which no data were obtained for the non-Head Start group.

Finally, we investigated whether special groups of children were more likely to have been screened for hearing deficiencies than others. Because almost all children in Maricopa and Mingo Counties had been screened, these two sites were excluded from these analyses. Analyses yielded two results: (1) children who were reported to have ear infections (or a history) by their mothers were more likely to be screened; and (2) screens were more common for families not covered by medical insurance, which suggests that Head Start targets services to children most in need or who would otherwise not receive them.

Conclusions

The prevalence of hearing problems was twice as high at pretest than at posttest--a finding that may be related to difficulties in testing the hearing of young children. Prevalence of hearing impairments at posttest was 12 percent, which is similar to other national estimates of children's hearing problems. The incidence of serous or recurrent otitis media was 14 percent for the Head Start and 12 percent for the non-Head Start group.

Exhibit 11-5

Prevalence of Hearing Problems for Head Start and Non-Head Start Children in the Cross-Sectional Posttest Sample (A, B, C)

		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
Any Hearing Loss	n	16/124	14/90	15/105	11/75	7/105	4/60	16/119	9/105	54/453	38/330
	%	12.9	15.6	14.3	14.7	6.7	6.7	13.4	8.6	11.9	11.5
Hearing Loss in Speaking Range (500, 1000, 2000 Hz)	n	13/123	13/90	12/101	10/75	7/105	3/59	15/117	9/104	47/446	35/328
	%	10.6	14.4	11.9	13.3	6.7	5.1	12.8	8.7	10.5	10.7
Hearing Loss at 4000 Hz	n	9/124	8/90	9/103	6/75	6/105	4/59	15/117	8/104	39/449	26/328
	%	7.3	8.9	8.7	8.0	5.7	6.8	12.8	7.7	8.7	7.9
Deficiency in Middle-Ear Impedance	n	5/105	10/85	11/99	7/69	10/104	1/60	24/113	16/109	50/421	34/323
	%	4.8	11.8	11.1	10.1	9.6	1.7[a]	21.2	14.7	11.9	10.5
Otitis Media[b]	n	18/127	10/101	13/108	13/86	16/106	6/61	16/119	12/109	63/460	41/357
	%	14.2	9.9	12.0	15.1	15.1	9.8	13.4	11.0	13.7	11.5
Hearing Loss at 500 Hz and Deficiency in Impedance	n	4/104	6/78	7/94	5/.62	4/104	0/59	13/111	8/104	28/413	19/303
	%	3.8	7.7	7.4	8.1	3.8	0.0	11.7	7.7	6.8	6.3
Hearing Loss at 500 Hz and Otitis Media	n	3/124	3/90	4/101	6/75	1/105	1/59	6/117	5/104	14/447	15/328
	%	2.4	3.3	4.0	8.0	1.0	1.7	5.1	4.8	3.1	4.6

[a] Group differences are statistically significant.

[b] Combination of prevalence of serous otitis media and recurrent otitis media (see Table 3-19).

Two-thirds of the Head Start children were tested for hearing deficiencies, although there was variation from site to site. Screenings were provided for almost all children in Maricopa and Mingo Counties; somewhat less than half of the children were tested in St. Clair County and only one-third of the children in Greene and Humphreys Counties received such services. Head Start's record with regard to referrals for treatment for children diagnosed to have problems was excellent, except in St. Clair County where no children were referred.

There were no differences in the hearing status of Head Start and non-Head Start children at posttest which could be attributed to program intervention. This is not surprising given the fact that most hearing deficiencies, particularly hearing loss, clinically cannot be remedied. All Head Start can do is ensure that problems are diagnosed and that treatment is obtained.

The design of the evaluation was not conducive to determining the real effects of Head Start on ear disease. Nonetheless, Head Start could provide an effective follow-up program for otitis media with repeated screening throughout the program year. One could hypothesize that a program of this nature would increase awareness of middle-ear problems in children and lead to increased intervention. There is some evidence, the health coordinators have commented, that Head Start has increased the frequency of hearing screens and improved arrangements for follow-up of suspected problems.

REFERENCES

The American Optometric Association. Optometric preventive health care. St. Louis, Missouri, 1980, 7.

Bachman, H. A. How environment affects visual development: A selected review. Journal of the American Optometric Association. 1975, 46, 998.

Beaton, G. H. Assessing nutrient adequacy of food as consumed: How to interpret the data. Paper presented at the Inaugural Symposium, Western Human Nutrition Research Center, Presidio of San Francisco, August, 1981.

Birch, H. G. and Gussow, J. D. Disadvantaged Children: Health, Nutrition and School Failure. New York: Grune and Stratton, 1970.

Bishop, Y. M. M., Fienberg, S. E., and Holland, P. W. Discrete Multivariate Analysis. Cambridge, MA: MIT Press, 1975.

Bothwell, T. H. and Finch, C. A. Iron Metabolism. Boston, MA: Little, Brown and Co., 1962. Brownlee, K. A. Statistical Theory and Methodology in Science and Engineering. New York: John Wiley and Sons, 1960.

Brownlee, K. A. Statistical theory and methodology in science and engineering. New York: John Wiley and Sons, 1960.

Brunelle, J. National Caries Program of the National Institute of Dental Research Report. The Nation's Health, 1982, 22, (2), 4.

Butler, J. A. and Baxter, E. D. Current structure of the health care delivery system for children. In Harvard Child Health Project, Volume III, Developing a better health care system for children, 1977, 35.

Buros, O. K. (Ed.) McCarthy scales of children's abilities. The Eighth Mental Measurement Yearbook. Highland Park, N.J.: Gryphon Press, 1978, 309-316.

Center for Disease Control. Nutrition Surveillance Annual Summary. Washington, D.C.: United States Department of Health and Human Services, Public Health Service, 1979.

Center for Disease Control. Preventing lead poisoning in young children: A statement by the Center for Disease Control. Washington, D.C.: United States Department of Health and Human Services, Public Health Service, 1978.

REFERENCES

Children's Defense Fund. EPSDT: Does it spell health care for poor children? Washington, D.C.: The Washington Research Project, 1977, 30.

Christakis, G. (Ed.). Nutritional assessment in health programs. American Journal of Public Health, 1973, 63, 38-75.

Cohen, J. Statistical Power Analysis for Behavioral Sciences, revised edition. New York: Academic Press, 1977.

Cohen, J. and Cohen, P. Applied Multiple Regression: Correlation Analysis for the Behavioral Sciences. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1975.

Comstock, E., St.Pierre, R. G., and MacKiernan, Y. Measuring individual plate waste in school lunches. Journal of the American Dietitic Association, September, 1981, 79, ____.

Cook, D. and Finch, A. Assessing iron status of a population. American Journal of Clinical Nutrition, 1979, 32, 2115-2119.

Dallman, P. R., Refine, C., and Yland, M. J. Sequence of development of iron deficiency in the rat. American Journal of Clinical Nutrition, 1982, 35, 671-677.

Dallman, R., Siimes, M., and Stekel, A. Iron deficiency in infancy and childhood. American Journal of Clinical Nutrition, 1980, 33, 86-118.

Davis, K., Gold, M., and Makuc, D. Access to health care for the poor: does the gap remain? Annual Review of Public Health, 1981, 2, 159-182.

Doyle, A. Incidence of illness in early group and family day-care. Pediatrics, 1976, 58, 607-613.

Drumwright, Amelia F. The Denver Articulation Screening Exam. Ladoca project and Publ. Found., Inc. 1973.

Dutton, D. Children's health care: The myth of equal access. In: Select Panel for the Promotion of Child Health. Better Health for Our Children. 1981, Vol. 4, 357-440 (DHHS Publ No. [PHS] 79-55071).

REFERENCES

Dwyer, Johanna J. Nutrition education and information. In: Better health for our children: The report of the select panel for the promotion of child health. Washington, D.C.: United States Department of Health and Human Services, 1981.

Egbuonu, L., and Starfield, B. Child health and social status. Pediatrics, 1982, 69, XXX-XXX.

Emmons, L., Hayes, M. Accuracy of 24-hour recalls of young children. Journal of the American Dietitic Association, 1973, 62, 409-415.

Fienberg, S. E. The analysis of cross-classified categorical data, second edition. Cambridge, MA: MIT Press, 1980.

Food and Nutrition Board, National Academy of Sciences. Recommended dietary allowances. Washington, D.C.: National Research Council, National Academy of Sciences, 1980.

Foster, R., Giddan, J. J., and Stark, J. Assessment of Children's Language Comprehension. Consulting Psychologists Press, Inc., 1973.

Fox, M. K. and Glantz, F. An Examination of Meal Quality in Day Care Centers and Family Day Care Homes. In Evaluation of the Child Care Food Program: Final Report on the Congressionally Mandated Studies, Cambridge, Massachusetts: Abt Associates, 1982.

Fria, T. Personal communication, Children's Hospital of Pittsburgh and University of Pittsburgh School of Medicine, 1981.

Frisancho, A. R. New norms of upper limb fat and muscle areas for assessment of nutritional status. American Journal of Clinical Nutrition, 1981, 34, 2540-2545.

Frisancho, A. New norms of upper limb fat and muscle areas for assessment of nutritional status. American Journal of Clinical Nutrition, 1980, 34, 2540-2545.

Frisancho, A. R. Triceps skinfold and upper arm muscle size norms for assessment of nutritional status. American Journal of Clinical Nutrition, 1974, 27, 1052.

REFERENCES

Garn, S. M., Ryan, A. S., and Abraham, S. The black-white difference in hemoglobin levels after age, sex and income matching. Ecology of Food and Nutrition, 1980, 10, 69-70.

Garn, S. M., Ryan, A. S., Owen, G. M., and Abraham, S. Income matched black-white hemoglob in differences after correction for low transferrin saturations. American Journal of Clinical Nutrition, 1981, 34, 1645-1647.

Gersovitz, M., Madden, J. P., and Smiciklas-Wright, H. Validity of the 24-Hour Dietary Recall and Seven-Day Record for Group Comparisons. Journal of the American Dietetic Association, 73, 48-55.

Habicht, J. P., Martorell, R., Yarbourgh, C., Malina, R. M., and Klein, R. E. Height and weight standards for preschool children. Are these really ethnic differences? Lancet, 1974, 611.

Haggerty, R. J., Roghmann, K. J., and Pless, I. B. Child Health in the Community. New York: John Wiley and Sons, 1975.

Hammill, P. V. V., Driad, T. A., Johnson, C. L., Reed, R. B., Roche, A. F., and Moore, W. M. Physical growth: National Center for Health Statistics profiles. American Journal of Clinical Nutrition, 1979, 32, 607-629.

Hegsted, M. Dietary Standards. Journal of the American Dietetic Association, January 1975, 66, 13-21.

Hegsted, M. What is a Healthful Diet? Primary Care, September, 1982, 9, 445-472.

Himes, J. H. Subcutaneous fat thickness as an indicator of nutritional status. In Greene, L. S. and Johnston, F. E. (Eds.) Social and biological predictors of nutritional status, physical growth and neurological development. New York: Academic Press, 1980, 9-32.

Hoaglin, D. C. A poissonness plot. The American Statistician, 1980, 34, 146-149.

Hoaglin, D. C. Letter values: A set of selected order statistics. In: Hoaglin, D., Mosteller, F., and Tukey, J. W. (Eds.). Understanding Robust and Exploratory Data Analysis. New York: John Wiley and Sons, 1983, pp. 33-57.

REFERENCES

Hoaglin, D. C. Resistant cross-age smoothing of age-specific percentiles. Memorandum SGEDA-261. Cambridge, MA: Department of Statistics, Harvard University, 1982.

Hoaglin, D. C., Iglewicz, B., and Tukey, J. W. Small sample performance of a resistant rule for outlier detection. In: *1980 proceedings of the statistical computing section*. Washington, D.C.: American statistical Association, 1981, pp. 148-152.

Hoekelman, R.A. (Ed). *Principles of pediatrics*; New York: McGraw Hill, 1978.

Hufano, L. and Hoepfner, R. Review of the McCarthy scales of children's abilities. *Measurement and Evaluation in Guidance*, 1974, *6*, 251-254.

Jelliffe, D. B. *The assessment of the nutritional status of the community*. WHO Monograph No. 53. Geneva, Switzerland: World Health Organization, 1966.

Kaufman, A. S., and Kaufman, N. L. Sex differences on the McCarthy scales of children's abilities. *Journal of Clinical Psychology*, 1973, *29*, 362-365.

Kerlig, S. G. and Baker, K. A. Physician's developmental quick screen for speech disorders (PDQ). Galveston, TX: Department of Pedidatrics, University of Texas Medical Branch at Galveston, 1975.

Kingsley, A. and Reynolds, E. L. The relation of illness patterns in children to ordinal position in the family. *Journal of Pediatrics*, 1949, *35*, 17-23.

Kovar, J. G. Adolescent Americans: What of their medical and health problems. *The Sciences*, April 1979, 18-21.

Kovar, M. G. Health status of U.S. children and use of medical care. *Public Health Reports* 1982, 97, 3-15.

Leventhal, J. M. Enuresis. In *Behavioral problems in childhood: A primary care approach*. New York: Grune and Stratton, 1981.

REFERENCES

Linusson, E., Sanjur, D., and Erickson, E. Validating the 24-Hour Recall Method as a Dietary Survey Tool. Archivos Latinoamericanos de Nutricion, 1974, 24 (2), 277-294.

Madden, J. P., Goodman, S. J., and Guthrie, H. A. Validity of the 24-Hour Recall. Journal of the American Dietetic Association, 1976, 68, 143-147.

Malina, R. M. Anthropometric correlates of strength and performance. Excercise and Sport Science Reviews, 1975, 3, 249-274.

McCarthy, D. McCarthy scales of children's abilities. New York: The Psychological Corporation, 1972.

Miller, R. G., Jr. Simultaneous statistical inference. New York: McGraw-Hill Book Company, 1966.

Mosteller, F. and Tukey, J. W. Data analysis and regression. Reading, MA: Addison-Wesley, 1977.

Mundel, D. S. Policy for primary medical care for children: a framework of basic choices. In Harvard Child Health Project, Volume III, Developing a better health care system for children, 1977, 11.

National Center for Health Statistics. Volume of physician visits by place of visit and type of service, U.S., July 1963-June 1964, Rockville, MD: National Center for Health Statistics, 1965.

National Center for Health Statistics. Physician visits: volume and interval since last visit, U.S. 1969. Rockville, MD: National Center for Health Statistics, 1972.

National Center for Health Statistics. Physician visits: volume and interval since last visit, U.S., 1975. Rockville, MD: National Center for Health Statistics, 1975.

National Center for Health Statistics. Monocular visual acuity of persons 4-74 years, U.S., 1971-72. Rockville, MD: National Center for Health Statistics, 1977, 43.

REFERENCES

National Center for Health Statistics. Basic dental examination findings of persons 1-74 years, United States, 1971-1974, by Kelly, J. E. and Harvey, C. R. *Vital and Health Statistics. Series 11, No. 214.* DHEW Publication Number (PHS) 79-1662. Public Health Service. Washington, D.C.: U.S. Government Printing Office, May 1979.

National Center for Health Statistics: Advance Report, Final Natality Survey, 1977. *Monthly Vital Statistics Report*, 1979, *27*, (Supp.) DHEW Publication No. (PHS) 79-120.

New York State Joint Legislative Committee on Nutrition. Nutritional Assay of 1200 New York Schoolchildren. Legislative Document No. 61, 1947.

North, A. F., Jr. Health services in Head Start in Zigler, E. and Valentine, J. (Eds.) *Project Head Start: A legacy of the war on poverty*. New York: The Free Press, 1979.

Owen, G. M., Kram, K. M., Garry, P. J., Lowe, J. E., and Lubin, A. H. A study of nutritional status of preschool children in the United States, 1968-1970. *Pediatrics*, 1974, *53* (Supp.), 597-645.

Paradise, J. L. Otitis media during early life: How hazardous to development? *Pediatrics*, 1981, *68*, 869-873.

Pipes, P. L. *Nutrition in infancy and childhood*. St. Louis: C. V. Mosby Company, 1977.

Pipes, P. L. Nutrition in Infancy and Childhood. *Primary Care*, September, 1982, *9*, 497-516.

Quah, R. Stark, A., and Meigs, J. Children's blood lead levels in New Haven: a population-based demographic profile. *Environmental Health Perspectives*.

Roche, A. F. Growth assessment in abnormal children. *Kidney International* 1978, *14*.

Roche, A. F. and Himes, J. H. Incremental growth charts. *American Journal of Clinical Nutrition*, 1979, *33*, 2041.

REFERENCES

Schour, I. and Massler, M. Survey of gingival disease using the PMA index. Journal of Dental Research (1948), 27, 733. Reprinted in Dunning, J. M. Principles of Dental Health (2nd ed.). Cambridge, MA: Harvard University Press, 1977.

Select Panel for the Promotion of Child Health. Better Health for our Children: A National Strategy. Volumes I-IV. Washington, D.C., U.S. Department of Health and Human Services, Public Health Service, 1981.

Singer, J. D., Granahan, P., Goodrich, N., Meyer, L. D., Barclay, C. D., Goodson, B. D., Fox, M. K., Himes, J. H., and Smith, J. Iron Status and its selected correlates: United States 1971-1974. Cambridge, MA: Abt Associates Inc., 1980.

Smith, J. Personal communication, University of Nebraska Medical School Nutritional Biochemistry Laboratory, 1980.

Sorenson, A. W., and Hansen, R. G., Index of food quality, Journal of Nutrition Education, 1975, 7, 53-57.

Srinivasan, S. R., Frerichs, R. R., and Berenson, G. S. Serum lipids and lipoproteins in children. In: Strong, W. (Ed.). Atherosclerosis: Its Pediatric Aspects. New York: Grune and Stratton, 1978.

Stare, F. J. (Ed.). Atherosclerosis. MEDCOM Learning Series, 1974.

Starfield, B., Bice, T., Schach, E., Rabin, D., and White, K. How "regular" is the "regular source of medical care?" Pediatrics, 1973, 51, 822-32.

Teele, D. W., Klein, J. O., Rosner, B. A. Epidemiology of otitis media in children, Annals of Otology, Rhinology, Laryngology, 1980, Supplement 68, 89.

Tukey, J. W. Exploratory Data Analysis. Reading, MA: Addison-Wesley, 1977.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. Nutrition and Your Health: Dietary Guidelines for Americans, 1980.

U.S. Department of Agriculture. A planning guide for food service in child care centers, Washington, D.C.: Food and Nutrition Service, 1976.

REFERENCES

U.S. Department of Health, Education, and Welfare. National Center for Health Statistics. *Preliminary findings of the first health and nutrition survey, U.S. 1971-1972: Dietary intake and biochemical findings*. Government Printing Office, 1974 (DHEW Publ No. [HRA] 74-1219-1).

U.S. Department of Health, Education and Welfare. *Head Start performance standards*. Washington, D.C.: Office of Child Development, 1975.

U.S. Department of Health and Human Services. *Health United States 1980*. Government Printing Office, 1981a.

U.S. Department of Health and Human Services. *Better health for our children: A national strategy*. Select Panel for the Promotion of Child Health. Volumes I-IV. Washington, D.C., Government Printing Office, 1981b [PHS] (DHHS Pub. No. 79-55071.)

U.S. Department of Health and Human Services. *Health United States*, 1981. Washington, D.C.: Government Printing Office, 1982. (DHHS Pub. No. [PHS] 82-1232).

Vaughan, V. C. and McKay, R. J. *Nelson's Textbook of Pediatrics*. Philadelphia: W. B. Saunders, 1975.

Velleman, P. F. and Hoaglin, D. C. *Applications, basics, and computing of exploratory data analysis*. Boston, MA: Duxbury Press, 1981.

Walker, D. K., Gortmaker, S. L., and Weitzman, M. *Chronic illness and psychosocial problems among children in Genesee County*. Boston, MA: Harvard School of Public Health, August, 1981.

Wilk, M. B. and Gnanadesikan, R. Probability plotting methods for the analysis of data. *Biometrika*, 1968, *55*, 1-17.

Williams, D. Racial differences of hemoglobin concentration: measurements of iron, copper, and zinc. *American Journal of Clinical Nutrition*, 1981, *34*, 1694-1700.

Williams, S., Henneman, A., and Fox, H. Contribution of food service programs in preschool centers to children's nutritional needs. *Journal of the American Dietetic Association*, 1977, 71, 610-613.

REFERENCES

Winter, S. T. The male disadvantage in diseases acquired in childhood. Developmental Medicine and Child Neurology, 1972, 14, 517-520.

Wolfe, B. Children's utilization of medical care. Medicare Care, 1980, 18, 1196-1207.

Young, C. M. Dietary Methodologies In Assessing Changing Food Consumption Patterns. Washington, D.C.: National Academy Press, 1981.

Zigler, E. and Valentine, J. (Eds.) Project Head Start: A legacy of the war on poverty. New York: The Free Press, 1979.

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APPENDIX 1A

EVALUATION METHODOLOGY

Design of the Head Start Health Evaluation

The Head Start Health Evaluation was designed to focus on the health status of Head Start children, within the context of previous findings, and to establish the linkages between the health status of Head Start participants and their participation in Head Start. The general design was to select a sample of Head Start programs (to collect extensive data on program operations) and, within each program, to administer a coordinated battery of health measures to a sample of participants. This approach, based on a sample of Head Start programs, required that Head Start participants be examined before and after their participation in Head Start to determine whether this participation had had an impact of their health status, and, if so, in what manner. Further, to guard against a variety of inappropriate inferences, it was essential to assess health status changes for a comparable group of non-participants from the same communities. Because changes in health status might be due to community health influences other than Head Start, the inclusion of the comparison group provided guards against incorrect attributions of impact. The overall design is illustrated in Table 1A-1.

During Stage I of the evaluation (which began in winter 1980) a pool of low-income children was recruited in each site. This pool consisted of children who met the income and other requirements for Head Start participation. At Stage II (in late March 1980) the children were randomly assigned within same age and sex categories; one-half of the eligible children were randomly

Table 1A-1

Evaluation Design and Implementation Stages
for Longitudinal Sample

Stage I	Pool of Head Start-Eligible Children			
Stage II	Head Start Group		Non-Head Start Comparison Group	
Stage III	Pretest Spring 1980	No Pretest test	Pretest Spring 1980	No Pre-test
Stage IV	Head Start Fall 80 - Spring 81		No Head Start	
Stage V	Posttest, Spring 1981			

assigned to enter Head Start the following fall, while the remaining children were assigned to the non-Head Start comparison group. Thus, treatment and comparison groups were comparable by design. Because the complete health examination undertaken in the pretest could possibly confound study results (that is, by giving all children a thorough preliminary examination, it was possible that subsequent referrals for health services based on the pretest assessments could mask the effects of later Head Start treatments), not all children in the Head Start and comparison groups were permitted to participate in the pretest data collection. Hence, at Stage III, only half of the children in each group were assigned to be examined during the pretest (in the spring of 1980).

Splitting the sample in this manner complicated the study because it required almost twice as much analysis in order to ensure that results held for both the children who were pretested and those who were not. But such an approach acted to protect against a worst-case possibility. (As it turned out results for these two samples were practically identical. While this might suggest that it was unnecessary to split the sample at pretest, such an inference is unfounded. Had this not been done, a major threat to the validity of the study would have been untestable, thus leaving study findings open to doubt.)

At Stage IV of the evaluation (beginning in fall 1980) children assigned to the treatment group entered the Head Start program and participated in the program (during the 1980-81 program year). At the time of posttest data collection, these children had received Head Start services for approximately one program year (8-9 months).

During the posttest at Stage V (in spring 1981) the health status of all children in the study was assessed; that is, the pretested children in both the Head Start group and the non-Head Start comparison group were reassessed, and the remainder of the children in both groups, who had not been pretested the previous spring, were assessed for the first time.

Site Selection Considerations

The characteristics and number of sites to be included in the evaluation was the subject of lengthy discussions between the evaluation staff and the Administration for Children, Youth and Families. It was recognized that the use of a data collection team of health specialists to collect health data (e.g., pediatricians for general pediatric health, pedodontists for dental health, and audiologists for hearing) would be costly and thus would limit the number of evaluation sites or result in very small samples of children in each of a larger number of sites. After much consideration of alternative strategies, available resources permitted implementation of the evaluation in four Head Start sites and examination of approximately 250 children per site.

Several site and program characteristics were used to select the four sites:

- urban versus rural setting;
- region of the country;
- strength of local health care system and availability of free or subsidized health care for Head Start eligibles;
- ethnicity of the Head Start population;
- size of the Head Start program; and
- strength of Head Start health services locally.

The rationale for using this set of characteristics was as follows. On average, rural areas have fewer physicians and hospitals per capita. When combined with the greater distances that must be travelled in order to obtain services, access to health care is often substantially worse in rural rather than in urban sites. Since a substantial portion of Head Start programs serve rural areas, it was necessary to represent such sites in this evaluation.

Region of the county has a subtler influence. Although available health care services vary widely across regions, the variation within a region is also very great. Thus, although it was possible to obtain, within some regions, a sample representative of the range of health care services, it was preferable to select a balanced sample of sites across regions to improve the face validity of the sample used for the evaluation.

The strength of the local health care system and the availability of free or subsidized health care services for the poor vary widely across the nation. Some areas have large numbers of doctors and clinics, while others have few. In many areas, health services are so uneven that one or more vital services may not be available locally. (For example, one of the selected sites had no dentist within easy reach.) Further, although in some areas nearly all Head Start children were eligible for Medicaid, this was not universally the case and in one site, there was no Medicaid program. Since, when an alternative health delivery service is available, Head Start simply mediates the delivery of the needed health care, the absence of such alternatives within a community invariably increases the management and resource burden on the local Head Start program. A comprehensive examination of the Head Start health care system thus had to take account of this important local variation in health care resources.

During the program year, 1980-81, the Head Start children served were 42 percent black, 33 percent white, and 20 percent Hispanic. To reflect this distribution, two predominately black, one white, and one Hispanic site were appropriate, given a total of four sites.

In addition, the size of the Head Start program was an important site selection criteria. Given an initially estimated within-site sample size requirement to recruit 150 Head Start and 150 comparison children (to allow for attrition), only large Head Start programs, serving more than 300, were chosen for participation in the study. Further, to increase the probability of identifying Head Start impacts on the health status of low-income children, selection was also limited to Head Start programs with well-implemented health and nutrition programs that were in compliance with the Head Start Performance Standards for the health component. Thus, Head Start sites were excluded from consideration if they were known to have weak health components. (While a process study examining Head Start services could be conducted in such sites, most of the major study issues could not be appropriately addressed.) No attempt, however, was made to identify Head Start programs with "model" health components. Instead sites were considered if the Head Start management information system, the Program Information Record (PIR), showed that the health program at that site was, by and large, operating competently and in a manner "typical" of that region. Thus, "typical" sites were selected, not so much to "represent" all Head Start programs but to evaluate standard health services delivery in the presence of the range of contextual factors which confront Head Start. Westinghouse Health Systems (the technical assistance contractor for the Head Start health services) and the U. S. Department of Health and Human Services regional offices also provided the assessments of the Head Start health services delivered in candidate sites for the Head Start Health Evaluation.

These criteria led to the selection of the following four sites:

- Greene County (Leakesville) and Humphreys County (Belzoni), Mississippi;
- St. Clair County (East St. Louis), Illinois;
- Maricopa County (Phoenix), Arizona; and
- Mingo County (Williamson), West Virginia.

The following site and program descriptions highlight the important features of each of the four sites. These characteristics are summarized in Table 1A-2 as well.

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Table 1A-2

Site, Health, and Head Start Program Characteristics of the Four Locations Chosen for the Head Start Health Evaluation

Characteristic	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Site Characteristics				
Degree of Urbanization of Largest Community	Rural	Urban	Urban	Rural
Department of Health and Human Services Region	4	5	9	3
Health Services Characteristics				
Number Physicians per 100,000	34/35[a]	77	199[b]	90
Number of Hospitals	1/2	6	29	1
Program Characteristics				
Funded Enrollment	613[c]	650	619	300
Total Actual Enrollment	620	899	458	345
Percent Children with Medicaid	38.9	68.2	0.0	27.1
Schedule: Days/Week	5	2 or 4[d]	4	4
Hours/Day	6.5	6	3.5 to 4	6
Number of Years Children Enrolled	Two to three years	Two to three years	One year (with one-year home-based program prior to center enrollment for some children)	Two years
Predominant Ethnicity of Children Enrolled	Black	Black	Hispanic	White

[a] Data for each county are presented separately: Greene/Humphreys.

[b] Many physicians and hospitals concentrated in areas of Maricopa County which are not accessed by families studied.

[c] Total funded enrollment for the grantee was 3700, total actual enrollment was 4278.

[d] Program operates four days/week. Some children only attend two days.

Greene and Humphreys. This "site" actually combined two rural counties in Mississippi with similar demographic and health service characteristics and served by the same Head Start grantee. Friends of Children, the Head Start grantee, was responsible for services to children in 11 counties, in addition to Greene and Humphreys, making it one of the largest Head Start programs in the country. Its total funded enrollment was 3700 children in the 1980-81 program year, of which 200 were enrolled in the programs in Greene County and 413 were enrolled in Humphreys County. With a schedule of five days per week and 6.5 hours per day, this program was the most intensive among those included in the Head Start Health Evaluation. Most of the children served by the program were black. They typically entered Head Start shortly after their third birthday and attended for two to three years prior to entering public school.

Delivery of health services to children in Greene and Humphreys counties was the most challenging in the evaluation. Lack of cooperation by the Welfare Department in the identification of EPSDT-eligible children meant that few of the required health services were Medicaid reimbursable. The skilled and dedicated management of the Head Start health component, in the face of such enormous local constraints, was evident and was an important factor in the delivery of health services.

St. Clair County. This site consisted of urban East St. Louis, Illinois and the surrounding more rural area. Although 1970 Census information showed high medical underservice in the county, during the succeeding decade many health care providers opened clinics in various parts of East St. Louis, even in the public housing projects, thereby vastly improving access to health care for low-income families. The Head Start grantee, the Economic Opportunity Commission, was funded to serve 650 children, 95 percent of whom lived in East St. Louis. The program operated on a four days per week schedule, but allowed the children to enroll for either a two-day or a four-day program of 6 hours per day. Turnover in enrollment was very high. Most of the Head Start children were black and some attended Head Start for two to three years prior to entry into public school.

In St. Clair County the Head Start program, on the recommendation of the Health Advisory Board, had taken a highly constructive approach to the delivery of health services. Prior to entry into Head Start and as a part of the application process, the child's parent was responsible for having the child screened for medical and (more recently) dental problems. This was feasible since health care services were readily available to most of the families in East St. Louis, although those in other areas in St. Clair County were less well served. Head Start reviewed the results of those pre-entry health screens, assisted in follow-up as needed, usually during the summer before the child entered the program. Because almost all of the children served by Head Start were Medicaid-eligible, the program needed to spend very few of its resources on health care service.

Maricopa County. This site was located in the suburbs of Phoenix, Arizona. Although many families in this county are economically very well off, those who are low-income are frequently considerably below the average for Maricopa County. Some areas of Maricopa County, such as Phoenix and Scottsdale, have exceptionally high levels of medical service; but the evaluation focused on suburbs of Phoenix, primarily Mesa, Chandler, Glendale, El Mirage, and Surprise. At the time of the evaluation, Arizona had no Medicaid program. (A Medicaid program has been instituted subsequently, however.) Without this program, access to publicly-supported health services was particularly difficult for low-income families. Although many low-income families used the Maricopa County Department for health care, some of the communities studied did not have a primary care clinic. Of the three Head Start programs operating in Maricopa County; the evaluation focused on the program operated by the Maricopa County Community Services Department. This program was funded for 419 children during the 1980-81 school year. Most children participated only for one year prior to entry into kindergarten. However, a small group of approximately 88 children participated in a one-year home-based program prior to center enrollment. The center schedule was four days per week, and most centers ran two half-day programs of approximately 3.5 to 4 hours per day. The majority (68%) of the children in the Maricopa County Head Start program were Hispanic, another 20 percent were white, and the remainder were black, Native American, or Asian. Some of the children enrolled in this program were from families of undocumented workers. For them, enrollment in Head Start provided the only access they had to health care services, because their families were not eligible for publicly-supported health services.

In Maricopa County, health services were available from the Maricopa County Health Department through a contract between Head Start and that agency. Since health services were sometimes geographically remote, the Health Department used local satellite primary care clinics, or Head Start transported the children to the nearest clinic for medical services. Dental services were provided to Head Start children in a mobile trailer which was moved from center to center. Because there was no Medicaid in Arizona, Head Start's contract with the Health Department provided all health services to children through an arrangement similar to a health maintenance organization (HMO).

Mingo County. This site was located in the heart of the Appalachian mountains of West Virginia. It is very rural and relatively inaccessible. Many families in this county are supported by the coal mining industry. Although overall the ratio of physicians to members of the general population was above average, few health services were available outside of Williamson, the county seat. The Head Start program grantee, the Mingo County Economic Opportunity Commission, was funded to serve 300 children. Approximately 90 percent of those enrolled were white. Most children, enrolled in this program, participated for two years on a schedule of six hours per day, four days per week.

In Mingo County there were very few health services available and, because the Medicaid reimbursement for medical screens was so low, local physicians were reluctant to treat Head Start participants with Medicaid coverage. On the other hand, Medicaid-eligible children did receive dental services without similar difficulties.

A Comprehensive Management Review (CMR) of this program, conducted just prior to the posttest data collection, revealed that this program was out-of-compliance with the Head Start Performance Standards on 87 items, many of them pertaining to the delivery of health services. (CMR's of the other programs were much more positive.) Staffing changes during 1980-81 in the Head Start central office, including the health coordinator, greatly fragmented the health service delivery effort and the effectiveness of this program. Coupled with the on-going need to renegotiate constantly for provision of health services by local providers, the delivery of health services to children in this site was the most chaotic observed by the evaluation.

Samples of Children

As mentioned previously, the evaluation design specified recruitment of 300 children per site and an optimistically low attrition rate of approximately 16.7 percent (50 out of 300 children) over the approximately 16 months between recruitment and posttest. The actual attrition rates of the children from the sample vastly exceeded the prior estimates.

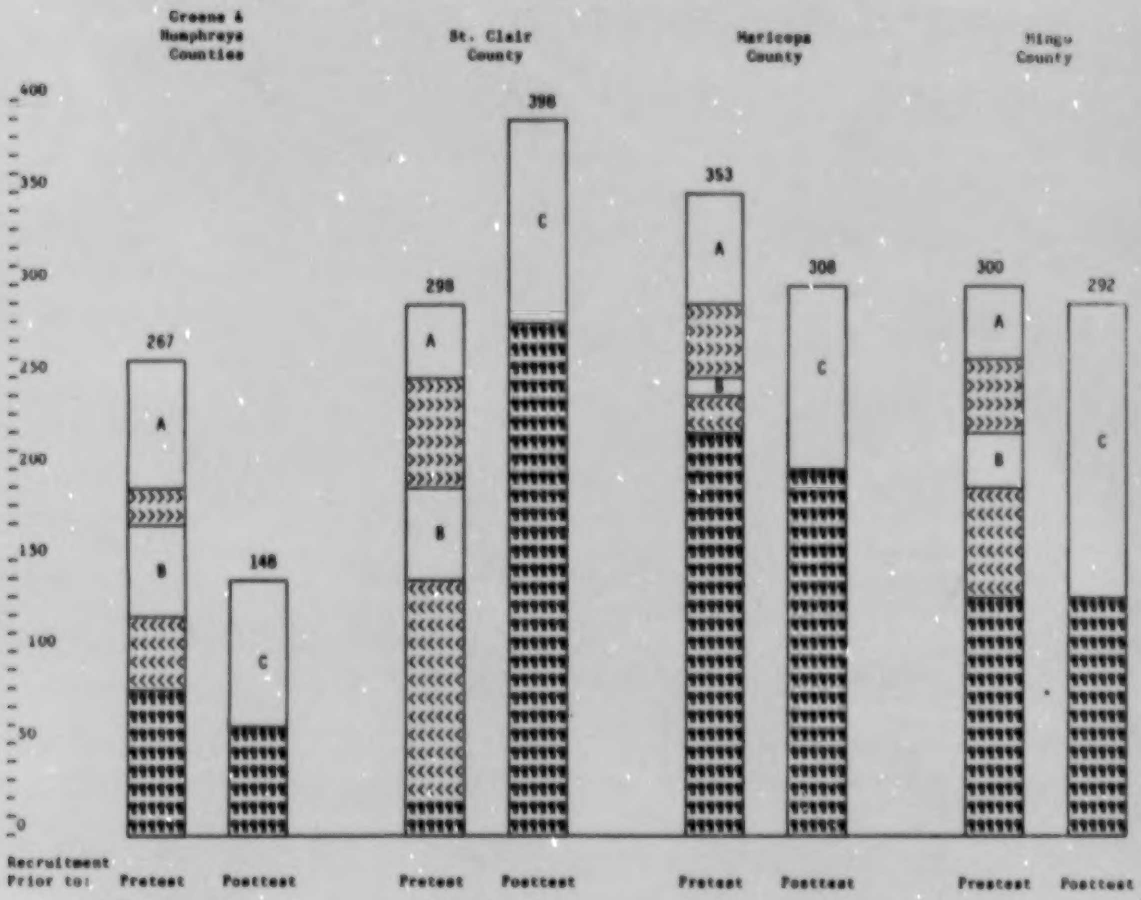
The experience of the evaluation vis-a-vis a Head Start-eligible population of children is shown in Exhibit C. This experience is instructive and reflects each of the Head Start program's own experience with recruitment and turnover among their eligible population: Greene and Humphreys Counties generally experienced the lowest rates of attrition and turnover while St. Clair County experienced a very high rate of attrition from the program. (Although the attrition rate in Maricopa County was very high among the children recruited for the evaluation, the Head Start program's added requirement that the family provide transportation for their child greatly delimited the children who participated in the program and reduced the numbers of children lost to attrition.) Hence the evaluation team's difficulties in retaining the families who had initially agreed to participate in the Head Start Health Evaluation was very similar to that of the Head Start program in each site with respect to recruitment and attendance of the children in the program.

As shown in Table 1A-3, 1218 children were recruited for the Head Start Health Evaluation between January and March 1980, prior to the pretest. However, of those rostered, nearly 38 percent were lost to attrition without a family background interview or health examination.

The pretest recruitment, therefore, produced the following results. Sample recruitment goals, although nearly met in all of

Table 1A-3

Number of Children Recruited for the Head Start Health Evaluation
and the Proportions Evaluated Versus Lost by Attrition



Key to Samples:

A	Initial recruitment sample: received both pretest and posttest (longitudinal sample).
B	Initial recruitment sample: received posttest only.
C	Augmentation sample recruited prior to posttest: received posttest only.
>>> D >>>	Initial recruitment/attrition sample: received pretest only.
<<< E <<<	Initial recruitment/attrition sample: received neither pretest nor posttest.
▼▼▼▼▼▼▼▼▼	Rostered and signed consent to participate only, never completed the family background questionnaire.

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the sites, produced fewer than desired children with sufficient family and health information needed for the evaluation. At the time of the pretest data collection in April 1980, those children with at least a completed family background questionnaire numbered 277 in St. Clair County, 180 in Greene and Humphreys Counties, 170 in Mingo County, and only 130 in Maricopa County. This shortfall, coupled with expected additional sample attrition, meant that the recruitment period had to extend beyond the pretest in order to ensure adequate sample sizes for posttest data collection. Recruitment for the augmentation sample occurred in Stage IV of the evaluation (see Table 1A-1).

Such modifications in the samples of children ultimately required five classifications of children to distinguish among those who remained in the study, those who dropped out, and those who were added after the pretest. These have been defined as separate samples of children in this report. Table 1A-4 shows the samples of children for each of the sites in the Head Start Health Evaluation who had sufficient information to analyze in one or more parts of the evaluation. The column percentages indicate, within each site, the contribution of each sample (from A to E) to the total sample size. This exhibit also demonstrates that rates of attrition among families who only participated in a part of the evaluation (Samples D and E) varied considerably among the sites: 50 percent in St. Clair County, 31 percent in Mingo County, 27 percent in Maricopa County, and 18 percent in Greene and Humphreys Counties. In all sites except St. Clair County, Sample C amply replaced the children lost from the study through attrition.

Because of the substantial changes in the original sample from attrition and augmentation, the evaluation conducted an extensive investigation of the possible implications of these sample

Table 1A-4

Number of Children in Evaluation by Sample and Site

Sample		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
A	n	74	42	56	36	208
	%	26.6	10.8	24.3	10.9	17.0
B	n	56	41	11	31	139
	%	20.1	10.6	4.8	9.4	11.3
C	n	98	111	100	161	470
	%	35.3	28.6	43.5	48.6	38.3
D	n	21	71	39	37	168
	%	7.6	18.3	17.0	11.2	13.7
E	n	29	123	24	66	242
	%	10.4	31.7	10.4	19.9	19.7
TOTAL		278	388	230	331	1227

A. Initial recruitment sample: received both pretest and posttest (longitudinal sample).

B. Initial recruitment sample: received posttest only.

C. Augmentation sample recruited prior to posttest: received posstest only.

D. Initial recruitment/attrition sample: received pretest only.

E. Initial recruitment/attrition sample: received neither pretest nor posttest.

changes. These investigations occurred at two points in time, in the fall after the Head Start children entered the program and after the posttest data collection as part of the analysis. In general, the first investigation indicated that minor differences existed between the Head Start and non-Head Start samples, but none were statistically significant. The more intensive investigation after the posttest produced a similar result; no consistent statistically significant differences among the samples (A, B, C vs. D, E) in either their health or personal characteristics. (The characteristics of the children who were only rostered was unknown and could not be examined further.)

Health Measures

Other design questions concerned the focus of the health measurement battery. Some of the basic questions included: What measures were required to assess Head Start program achievements due to the Performance Standards? What extant reliable measures were available? Would these measures provide comparable health indicators to prior studies and evidence of Head Start's impacts on children's health?

Since the evaluation was to assess Head Start in light of the Performance Standards, measures were selected to cover the full range of health services mandated by these standards (see Table 1A-5). In general, these health measures consisted of a series of examinations and observations of the child conducted by health professionals and paraprofessionals, and several parent interviews to fill out the child and family's health history. The following battery of health examinations was chosen:

- pediatric evaluation;
- dental evaluation;
- anthropometric evaluation;
- hematology evaluation;
- developmental evaluation;
- speech and language evaluation;

Table 1A-5

Health Services Mandated by Head Start Performance Standards

Health Services
Health history, including: Copy of immunization record
Health screens, including: Growth assessment (height, weight, age), Vision testing (for visual acuity and strabismus), Hearing testing; Hemoglobin and hematocrit level, Tuberculin testing where indicated; Selected additional screens: sickle cell anemia, intestinal parasites, and lead poisoning; Determination of immunization status, Identification of speech problems; Identification of special needs of handicapped children
Medical examination of: All systems or regions suspect by history or health screen Specific regions commonly important in age group (skin, eyes, nose, throat, heart, lungs, groin)
Medical treatment of: All health problems detected Completion of recommended immunizations against seven diseases
Dental examination and basic services including: Relief of pain or infection Restoration of decayed primary and permanent teeth Pulp therapy for primary and permanent teeth, as necessary Extraction of non-restorable teeth Dental prophylaxis and instruction in self-care oral hygiene procedures Application of topical fluoride in unfluoridated communities
Health education, including: Provision of information to parents of all available health resources Encouragement of parents to become involved in health care process Integration of health education into ongoing program activities Familiarization of children with all health services they will receive prior to delivery of services
Nutrition services including: Nutrition assessment Meals and snacks

- vision evaluation;
- hearing evaluation; and
- nutritional observation.

In addition to these child evaluations, a parent interview would consist of three major parts:

- health history of child;
- nutritional evaluation of child; and
- family background.

There were some extant measures to consider. Although the Head Start Health evaluation was one of the first longitudinal assessments of the impacts of health intervention programs on the health status of low-income children, the experiences of other health researchers in such previous major cross-sectional surveys of children's health status as the First National Health and Nutrition Examination Survey, the Preschool Nutrition Survey, and the Ten-State Nutrition Survey provided guidance. Table 1A-6 compares some of the characteristics of the Head Start Health Evaluation with these prior surveys.

Although these prior cross-sectional studies proved to be quite useful in designing the current effort, great care had to be exercised in applying the lessons of this previous research to the present evaluation. Because this evaluation was longitudinal rather than cross-sectional in design and because it focused on a single treatment, Head Start, it differed markedly from all prior research in this area. The contribution of these prior studies to the design of the present evaluation was therefore greatest in the area of cross-sectional measurement selection and in the choice of standard methods of analyzing and reporting health-related information. In addition, the prior data were particularly useful as

Table 1A-6

Characteristics of Four Surveys of the Health Status of Low-Income Children

Survey Characteristic	Preschool Nutrition Survey	Ten-State Nutrition Survey	First National Health & Nutrition Examination Survey	Head Start Health Evaluation
Sample Size: Children below age 6	3441	3700	1500	1227
Ethnic Distribution (Percent):				
White	80	43	66	35
Black	14	40	34	57
Hispanic	5	17		12
Other	1	1		2
Geographic Distribution	36 states + D.C.	10 states	100 sites	4 sites
Survey Dates	Nov. 1968-Dec. 1970	May 1968-May 1970	1971-1974	April 1980-April 1981
Income Distribution	33% had incomes > 3x (poverty level)	5% had incomes > 3x (poverty level)	random with poor over-sampled	all below poverty level
Objective	Describe nutritional status of preschool children	Ascertain incidence and location of malnutrition	Establish national nutrition surveillance system	Establish health status and estimate Head Start impacts

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sources of reference data for comparison with these low-income children's health and nutritional status.

The health measures used in the Head Start Health Evaluation also had to permit attribution of changes in health status over the course of a year to the intervention of the Head Start program. The selection and development of the appropriate measures was complex in that many of the measures useful for a cross-sectional analysis, that is, useful in determining health status, are of limited utility in examining longitudinal changes in this status.

One of the important problems in this regard was measuring degrees of "wellness". For a large number of health domains it is only possible to quantify degrees of disease, the absence of disease being designated as the state of being "well". There are often no degrees of "wellness". Thus, we would generally expect to see no change over the program year in children originally classified as "well". For example, children with good hearing or vision should not be expected to hear or see "better" after a year in Head Start. Consequently, if change was to be measured it generally had to be sought in improvements measured in that segment of the population for which a health problem was identified. Because the number of children afflicted with any given condition is generally small, statistical analysis was consequently more difficult.

After consideration of these design issues, the evaluation selected and developed the following battery of evaluation measures.

> Pediatric Evaluation. This evaluation, administered by a pediatrician, assessed the child's general health condition in conjunction with a detailed health history (described below). Since no extant examination instrument proved completely acceptable, the final instrument was developed by selecting and modifying items from three sources: the Rochester Child Health Study, the First National Health and Nutrition Examination Survey, and the physical examination form used in the Medical Diagnostic Clinic of Children's Hospital in Boston.

The pediatric examination instrument contained nineteen separate sections, each for a different body area or system, and was used to record and describe any abnormal findings. The examination contained items pertaining to the head, eyes, nose, throat and ears, including the eardrum and auditory canal, auscultation of the lungs, abdominal and kidney evaluation, evaluation of heart sounds, joint movements, and reflexes. Blood pressure was also recorded.

Dental Evaluation. This evaluation, in conjunction with a dental history (described below), was administered by a pedodontist. The dental examination included an assessment of a variety of aspects of dental health. The number and location of decayed and filled surfaces and missing teeth provided a measure of the prevalence and incidence of dental caries, the treatment needs of the children studied, and the results of dental services. A periodontal inspection assessed inflammation of the gingiva or soft gum tissues. The degree of plaque was measured using an oral hygiene index developed for the evaluation. A classification of the occlusion, or the relationship of the upper and lower teeth, and an index of open bite were also recorded. The dental evaluation concluded with a clinical judgment of the child's dental health status. Findings included abnormal caries, inflammation, premature loss of permanent teeth, and presence of nonvital teeth.

Anthropometric Evaluation. This evaluation was structured to be administered by a paraprofessional trained to follow a specific protocol for collecting reliable anthropometric information. The measures chosen were considered standard for determining growth status including height, weight, arm circumference, and triceps skinfold thickness.

Hematologic Evaluation. This evaluation was based on assays of blood samples collected from children during the health evaluations. Blood samples were collected by laboratory technologists accustomed to performing venipunctures on children. The assays performed included hematocrit, hemoglobin, free erythrocyte protoporphyrin, total iron binding capacity, serum iron, transferrin saturation, ferritin, cholesterol, vitamin C, vitamin A, and B-carotene.

Developmental Evaluation. The developmental evaluation, like the anthropometric evaluation, was designed for administration by a paraprofessional trained to follow a specific protocol. The Motor Scale of the McCarthy Scales of Children's Abilities was used. The McCarthy Motor Scale contains items that assess the fine and gross motor development of the child--for example, the ability to draw a circle or stand on one foot--abilities considered to be related to the physical health of children. According to the reviews of this instrument in Buros (1978, pp. 309-314), this battery was better suited to the detection of developmental disabilities than other tests. Furthermore, a study by Kaufman and Kaufman (1973) provided evidence that the McCarthy scales were comparatively less sensitive to black-white differences in children below 6 years of age.

The other developmental measures employed were assessments of the child's behavior according to parental report. These assessments of the child's behavior were based on parents' responses about the frequency of 29 commonly occurring behaviors. These behaviors were scaled to describe the extent to which the child appears overly aggressive or withdrawn.

Speech and Language Evaluation. This battery was administered by speech pathologists. The evaluation included screening for both speech and language problems. The battery included several speech evaluation measures The Denver Articulation Screening Examination by Drumwright (1973) was used to assess the children's articulation and a portion of the Physician's Developmental Quick Screen for Speech Disorders assessed other speech characteristics, including intelligibility, voice quality, typical pitch, and typical volume.

Another portion of the battery assessed both receptive and productive language problems. The language comprehension instrument, the Assessment of Children's Language Comprehension (ACLC by Foster, Gidden, and Stark, 1973), assessed language comprehension and consisted of four subsections which measured the child's ability to process an increasing number of syntactic units. Each child was shown a picture and presented with a stimulus word; the child then pointed to the appropriate stimulus object in the picture. Another section of the speech and language evaluation measured verbal expression by using the sentence repetition component of the Fluharty Language Screening Test for Preschool Children. The child repeated the stimulus sentence produced by the speech pathologist and received a score for each sentence repeated accurately.

Vision Evaluation. The vision evaluation, administered by an optometrist, was intended to detect the presence of actual or potential vision system impairment in each child. It consisted of a set of components designed to examine the following vision functions: occulomotility, strabismus, convergence, retinoscopy, visual acuity, stereo acuity, binocular function, and color differentiation. In addition, the eyes were examined, both externally and internally, to determine the presence or absence of eye damage, lens or nerve damage, encrusted eyes, or other physical eye disorders. The parent of each child was also interviewed to determine awareness and understanding of any visual difficulties of the child.

Hearing Evaluation. The purpose of the evaluation was to determine hearing impairments in one or both ears, secondary to chronic or recurrent otitis media. Designed to be administered by an audiologist accustomed to testing preschool children, it included pure tone audiometry and impedance tympanometry. The audiometry tests for hearing loss in each ear were conducted at 500, 1000, 2000, and 4000 Hz. In addition, the tympanometry measured middle-ear impedance and was used to detect occlusion or other pathologies associated with the middle ear. In general, this evaluation provided information on both hearing loss from conductive and sensorineural problems.

Family Background Interview. This interview was designed to obtain baseline data on the family and child at the outset of the Head Start Health Evaluation and, also, data on any changes which took place between pretest and posttest. At each site an evaluation assistant administered the interview to parents or primary caretakers of each Head Start and non-Head Start child. The interview obtained demographic information about family size (number of household members--adults and children), marital status, access to services, education of adults, mobility of the household, insurance coverage, income, employment status, ethnicity, and language used. This interview also examined the parent's impressions of the child's behavior and, for Head Start children, the parent's knowledge of services provided to their child.

Health History. A medical, dental, and vision history of the child was administered to each child's parent at the time of the health evaluation and was intended to provide important health information to aid in the evaluation of the child's health status. The medical health history was developed from a variety of sources, including the Rochester Child Health Study, the Health Interview Survey (National Center for Health Statistics), and the medical history intake form from the Medical Diagnostic Clinic of Children's Hospital Medical Center in Boston. Items were modified to meet the requirements of the evaluation of health services and the evaluation's longitudinal design. This portion of the history included prenatal and childhood health, illnesses and infections, evidence of exposure to tuberculosis or intake of lead, incidence of accidents and injuries of the child, hospitalizations, records of immunizations and access to and utilization of medical services.

The dental portion of the health history focused on dental care, oral hygiene habits, dental service utilization, and access to flouride. The health history also included a vision history which focused on evidence of vision problems that could be observed by the parent (such as the child's complaining of headaches or burning eyes), prior prescriptions for glasses, or vision therapy for the child, and utilization of other vision services (such as a vision examination).

Dietary and Nutritional Habits Interview. This parent interview was designed to be administered by a nutritionist and contained two parts: a 24-hour dietary intake, and a 3-month food frequency covering the child as well as the nutrition habits of the family. The 24-hour recall and food frequency was adapted from the First National Health and Nutrition Examination Survey protocol.

The primary purpose of the interview was to examine in more depth the child's dietary practices, the family dietary practices, the family's food preparation practices, the parent's knowledge of nutrition, the family's participation in food subsidy programs (such as Food Stamps and WIC), and evidence of any Head Start impact on the eating habits of the child. The information collected from this parent interview provided evidence of the family knowledge, attitudes, and behaviors related to good nutritional practices.

Nutrition observation. Used only at the posttest on the Head Start children, this instrument was designed to be administered by a nutritionist or person trained in collecting food data in accurate portion sizes. A dietary interview (described below), including a 24-hour recall of the child's consumption, was part of the evaluation battery. Since Head Start parents could not reliably report their child's consumption while in center care, an observation of this portion of the child's day was designed. This instrument included records of the child's intake of foods consumed during meals and snacks at the Head Start center.

General Analytic Methodology

Because the measures collected to address the research questions varied tremendously in type, form and purpose, the analyses of these data have drawn on a variety of statistical techniques. These techniques are summarized in Table 1A-7.

The analysis of the pretest data was primarily descriptive and aimed at providing an assessment of the health status of children in terms of their health characteristics and particularly, the types of health deficiencies with which these Head Start-eligible and low-income children confront the Head Start health services delivery system. Since preliminary analyses demonstrated that both the randomly assigned groups of low-come children (those who would enter Head Start in the fall of the 1980 and those who would not participate in the program during the 1980-81 program year) were essentially equivalent, analyses and data presentation of the pretest data reflect the combination of both groups of children. Simple, overall descriptions of the health status of the children were not sufficient. The dramatic variations from one site to another in health services available to low-income children and the consequent health status of the children made it necessary to pay careful attention to the pretest results in each site, as well as across all four sites.

Moreover, although there was considerable similarity in the apparent quality of the health services delivery system for each

Table 1A-7

Summary of Major Statistical Techniques by Domain of Analysis

Domain of Analysis	Statistical Technique
Attrition	Contingency tables and analysis of variance
Pediatric	Contingency tables
Dental	Contingency tables and Poisson models
Anthropometry	Contingency tables, smoothing, regression, and analysis of covariance
Diet/Nutrition	Contingency tables, regression, and analysis of covariance
Hematology	Contingency tables, regression, and analysis of covariance
Developmental	Contingency tables, regression, and analysis of covariance
Speech	Contingency tables, regression, and analysis of covariance
Vision	Contingency tables, regression analysis, and discrete multivariate analysis
Hearing	Contingency tables and regression, and analysis of covariance

of the programs according to the estimates available in the management information Program Information Records (PIR's), there was considerable variability in the actual circumstances each program confronted in delivery of health services to the Head Start children. Considerably more in-depth information on the actual content of the children's health records was required to assess the delivery of health services in each of the sites. Again, the variation from site-to-site required paying attention to each program's service delivery, as well as to the pattern of delivery across all four sites to understand the potential impacts of the delivery of health services.

The analysis of the posttest data also focused particularly on comparisons between the experiences of the Head Start and non-Head Start children during the 1980-81 program year. Parent reports on both groups of children provided wide-ranging information on both the need for health services and the receipt of those services during the previous year. In many cases, the Head Start health records provided more detailed information on the services received by the Head Start children than the mother's of these children provided. In addition, for each of the children in the longitudinal sample, each health problem which had been identified at pretest and communicated to the child's local health provider (and to the Head Start program for the Head Start children) was specifically followed up at posttest for evidence of treatment and/or medical management. Some of the most detailed analyses conducted during the evaluation, focused on this information.

Using the posttest data, extensive analyses were conducted to assess the apparent impacts of the Head Start health services delivery system on the health status of children by direct comparisons of the Head Start and non-Head Start groups. These analyses also adjusted for any apparent non-equivalences between groups were feasible. Analyses focused on the longitudinal sample of 208 children identified a few Head Start impacts. Similar analyses of the entire posttest sample of 817 children (which had somewhat more power to detect small effects) produced slightly more evidence of the some of the impacts of the health services where those health services were delivered. Extensive examination of various types of "at risk" children provided little more insight.

Appendix 1B

Reference Guide to Location of Findings in Head Start Health Evaluation Report

APPENDIX 1B

REFERENCE GUIDE TO LOCATION OF FINDINGS IN HEAD START HEALTH EVALUATION REPORT

Page Number in Executive Summary	Topic in Part Two	Source of Information in Final Report	Page Number in Final Report
	Question One		
9	Accidents	Exhibit 3-8	80
	Perinatal Health		
9	Children	Exhibit 3-7	78
9	Mother's	Exhibit 3-6	78
9	Mother's Age	Table 3-10	3A-11
	Pediatric Health		
9	Any Problem	Exhibit 3-4	77
10	Specific Problem	Exhibit 3-2	74
	Dental		
10	Affected Surfaces	Exhibit 4-3	107
10	Urgent Care	Exhibit 4-6	109
10	Nutrition	Exhibit 6-4	171
10	Motor Development	Exhibit 8-4	283
	Speech and Language		
10	Any Problem	Exhibit 9-2	302
10	Articulation Delay	Exhibit 9-3	303
10	Vision	Exhibit 10-2	321
11	Hearing	Exhibit 11-2	335
	Question Two		
	Medical		
11	Examinations	Exhibit 2-4	59
11	Treatment	Exhibit 2-4	59

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	Dental		
11	Examinations	Exhibit 2-4	59
11	Problems	Exhibit 2-4	59
11	Treatment	Exhibit 2-4	59
11	One Site: Decay	Exhibit 4-12	120
11	One Site: Increase	Exhibit 4-10	117
11	One Site: Fillings	Exhibit 4-10	117
	Nutrition		
12	Intakes Head Start	Exhibit 6-13	190
12	Intakes Non-Head Start	Exhibit 6-27	214-5
12	Food Assistance	Exhibit 6-20	203
12	Meals at Home	Exhibit 6-38	237
12	Nutritional Assessment	Exhibit 7-9	262
12	Blood Tests	Exhibit 7-9	262
	Immunizations		
12	Total	Exhibit 2-4	59
12	By Head Start	Exhibit 3-12	85
12	Development Assessment	Exhibit 8-6	286
13	Speech and Language	Exhibit 9-4	304
13	Vision Screen	Exhibit 10-3	324
13	Hearing Screen	Exhibit 11-3	337
	Parent Involvement		
13	Visited Classroom	Exhibit 6-14	193
13	Visited Once/Week	Exhibit 6-15	194
13	Food and Nutrition Meeting	Exhibit 6-14	193

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13	Health Records & Reports	Exhibit 2-4	59
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14	Medical Examination	Exhibit 3-18	94
14	Other Preventive Health Services	Exhibit 3-19	95
14	Treatment of Problems Found	Table 3-16	3A-24
14	Problems at Post-test	Table 3-14	3A-15
14	Single & Multiple Problems	Table 3-17	3A-25
	Dental Examination		
14	Head Start	Exhibit 4-8	113
14	Non-Head Start	Exhibit 4-9	115
14	Fillings	Exhibit 4-14	122
14	Dental Visits	Exhibit 4-18	127-8
	Nutrition		
15	Meals at Home	Exhibit 6-38	237
15	Head Start Present vs. Absent	Exhibit 6-25	210
15	vs. Non-Head Start	Exhibit 6-26	210
	Speech Evaluation		
15	Head Start	Exhibit 9-4	304
15	Non-Head Start	Exhibit 9-7	309
	Therapy Services		
15	Head Start	Exhibit 9-4	304
15	Non-Head Start	Exhibit 9-7	309

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	Vision Screen		
15	Head Start	Exhibit 10-3	324
15	Non-Head Start	Exhibit 10-4	326
	Question Four		
	Pediatric Evaluation		
15	Problems at Post-test	Table 3-14	3A-15
16	Treatment of Problems Found	Table 3-16	3A-24
	Dental Evaluation		
16	Head Start	Exhibit 4-8	113
16	Fillings	Exhibit 4-10	117
16	Dental Hygiene	Exhibit 4-15	123
16	Prevalence of Cavities	Exhibit 4-11	118
16	Anthropometry	Exhibit 5-8	145
	Nutrition		
16	Cross-Sectional	Exhibit 6-24	209
16	Longitudinal	Exhibit 6-16	197
	Head Start Present		
17	vs. Absent	Exhibit 6-16	197
17	vs. Non-Head Start	Exhibit 6-16	197
17	Food Assistance	Exhibit 6-20	203
	Biochemical Evaluation		
17	B-carotene	Exhibit 7-8	261
17	Abnormal Hgb or Hct	Exhibit 7-10	264
17	All Measures	Exhibit 7-11	266

Page Number in Executive Summary	Topic in Part Two	Source of Information in Final Report	Page Number in Final Report
	Developmental Evaluation		
17	No Problems	Exhibit 8-8	291
17	Longitudinal	Exhibit 8-7	289
	Speech and Language Evaluation		
18	Deficiencies at Posttest	Exhibit 9-9	311
18	One Site	Exhibit 9-10	312
18	Vision Evaluation	Exhibit 10-5	327
18	Hearing Evaluation	Exhibit 11-5	340

Page Number in Executive Summary	Topic in Part Three	Source of Information in Final Report	Page Number in Final Report
	Pediatric Evaluation		
	Pediatric Health		
19	Any Problem	Exhibit 3-4	77
19	Specific Problem	Exhibit 3-2	74
	Perinatal Health		
20	Mother's	Exhibit 3-6	78
20	Mother's Age	Table 3-10	3A-11
	Medical Services		
20	Examination	Exhibit 3-10	81
20	Immunization	Exhibit 3-10	81
20	TB Test	Exhibit 3-12	85
20	Lead Test	Exhibit 3-12	85
20	Problems at Post-test	Table 3-14	3A-15
21	Treatment	Exhibit 3-20	96
21	Other Preventive Health Services	Exhibit 3-19	95
	Dental Evaluation		
21	Comparison to Prior Surveys	Exhibit 4-7	111
21	Pretest Prevalence	Exhibit 4-3	107
21	Dental Services	Exhibit 4-8	113
	Impacts		
22	Incidence	Exhibit 4-10	117
22	Prevalence	Exhibit 4-11	118
22	Brush Teeth	Exhibit 4-18	127-8
22	Hygiene Practices	Exhibit 4-15	123

Page Number in Executive Summary	Topic in Part Three	Source of Information in Final Report	Page Number in Final Report
	Anthropometric Evaluation		
	Pretest		
22	Percentiles	Exhibit 5-3	139
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22	Percentiles	Exhibit 5-9	146
23	Below 10th Percentile	Exhibit 5-10	148
	Nutrition Evaluation		
	Pretest & Prior		
23	Surveys	Exhibit 6-5	173
23	Problematic Nutrients	Exhibit 6-4	171
	Head Start Present		
24	vs. Absent	Exhibit 6-25	210
24	vs. Non-Head Start	Exhibit 6-24	209
24	Marginal Intakes	Exhibit 6-21	205
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APPENDIX 1C

ACKNOWLEDGEMENTS

This six-year evaluation is the accumulated achievement of numerous persons and groups. Without the cooperation, patience, and assistance of all, we never could have completed the study. Several of these deserve special recognition for their contributions to the evaluation effort.

We are especially grateful to Dr. Bernard Brown, the Government Project Officer for this evaluation, for his continuing interest, assistance, and support. At several points in the evaluation, he played a central role in pursuing some of the more complex methodological issues of this study. Two other ACYF officials were particularly instrumental in conducting this study. They are Dr. Raymond C. Collins, Director, Office of Program Development and Mr. Dennis Deloria, Program Analyst, Office of Program Development. Both provided continuing interest and constructive guidance throughout.

We also express our appreciation to other ACYF officials who contributed their interest and enthusiasm to this study--Dr. Phyllis Stubbs, Director, Health Services Branch, Head Start Bureau; Dr. Margaret Phillips, Nutritionist, Head Start Bureau; Ms. Marion Slatin, Child Health Specialist, Health Services Branch, Head Start Bureau; and Dr. Linda Randolph, formerly Director, Health Services Branch, Head Start Bureau, currently Director, Office of Public Health, New York State Department of Public Health. To the staff of the Regional Offices, we extend our warm appreciation for their help in "trouble-shooting" at some critical stages in the evaluation.

We further acknowledge the valuable assistance and patient support the Head Start Program directors and staff at each of the study sites have provided in the evaluation effort. They gave generously of their time, responding to questions about the operations of their program and services delivered to children and families. We are especially grateful to the following: in Greene and Humphreys Counties--Marvin Hoagin and Barbara Jackson; in St. Clair County—Barbara Westerfield and Frances Young; in Maricopa County—Roberto Armijo, Irma Moreno, Mary Beles, and Jean Hughes (from the Maricopa County Health Department); and in Mingo County--Patty Spence, Peggy Childers and Ida Mae Copley. Very special and heartfelt thanks go to the families and children who participated in the evaluation. We sincerely appreciate the time they donated during the data collection periods. Together, program staff and the participating families in both the Head Start and comparison groups provided invaluable insights into how the Head Start health services affect the lives of children.

Our National Advisory Panel provided the evaluation staff with guidance, assistance, invaluable insight and support from the start of this six-year undertaking. In essense, the expertise and experience they freely shared with us made it possible to conduct this evaluation. Several panel members remained with us throughout and deserve special recognition for their contributions to the study: William Bryant, D.M.D.; Jacob Cohen, Ph.D.; Johanna Dwyer, Ph.D.; Thomas Fria, Ph.D.; Fernando Guerra, M.D.; Gertrude Hunter, M.D.; Jacqueline Liebergott, Ph.D.; George Owen, M.D.; Steven Shusterman, D.M.D.; and Jack Smith, Ph.D.

Our data collection teams of consulting health professionals contributed significantly to the evaluation with their time, insights, dedication, willingness to work under unusual circumstances, and good humor. Many of the following individuals returned for each of the three years of data collection (pilot, pretest and posttest):

Pediatricians

Linda Cohen
Larry Deutsch
John Graef
Joan LaBel
Owen Mathieu
Jose Santos
Ben Siegal
Michael Weitzman
Patricia Whitley

Pedodontists

Gary Lindner
David Meadows
Andrew Sonis
Adel Tawadros
Timothy Wright

Optometrists

Stephanie Johnson
Wilburn Lord

Speech Therapists

Gwen Chambliss
Sharon Hendrickson
Karen Hurst
Betty McCoy
Judy Meyer
Sonia Pomotowski
Janice Tucker
Patricia Wise

Audiologists

Julie Hauser
Kathe Kurmin
Cynthia Mauro
Lavonne Millisits
Diane Sabo

Medical Technologists

Zelda Anderson
Linda Boggs
Cynthia Kelly
Beth McMaine
Dorothy Million
Kathy Nielson

Nutritionists

Raul Alejandro
Nan Allison
Irene Berman
Ellen Blumensteil
Joanne DeCristofaro
Karen Fullerton
Barbara Jacobs
Lyn Konstant
Lilianne L'Heureux
Grace Lloyd
Ralph Morales
Regina O'Shea
Roni Pelzman
Mary Rajala
Fran Rohr
Sandra Seiler
Nancy Sheard
Ana Sanchez
Naomi Urata
Kathy Wallach
Ed Wong

Many Abt Associates staff contributed energy, ideas, and time to making the data collection operations work. Our data collections were made possible by the conscientious and resourceful work of evaluation assistants at each of the sites. They were responsible for recruiting families into the evaluation, maintaining contact with them, and organizing their participation during the data collections. The outstanding evaluation assistants were: Janice Brown, Emilia Borbia, Tammi Bucci, Gail Horton, Cozie Leverette, Felicia Newby, Maria Rodriquez, Judy Simon, Sandra Thompson and Dora White.

Other staff who contributed enormously to the data collections were Alan Bell, Dr. David Connell, Ellen Glovsky and Ed Maddox; each played major roles in designing and conducting the pilot test and some aspects of the pretest of the evaluation. Dr. John Himes designed the anthropometric data protocol and Mary Kay Fox refined the nutrition and meal observation protocols. Others who also played major roles in site development were William Accomando, Barbara Shank, Janet Smith, and Nancy Stevens. Mary Kay Fox, John Himes and Clinton Sornberger contributed significantly to training the data collection teams.

Catherine Barclay, Diane Foster, Mary Kay Fox, John Himes, Harrit Nauta, Jeffrey Pearce, and Janet Wertheimer ably managed the twenty-five (or more) person teams during the posttest of the evaluation. Julita Milliner, Joanne Nester, Collette Wallace, and Gail Vasington organized and supervised the meal observations staff.

Finally, I want to acknowledge the Abt Associates staff and consultants who played major roles in analyzing and reporting the data. Drs. John Himes, Clinton Sornberger, and David Hoaglin have contributed, in successive stages, as Directors of Analysis. In the later phases of the study, Jeffrey Pearce designed and managed the data base and Ellen Lee contributed analysis support. Most of the chapters of the report have had numerous contributions from many analysts and staff members. Those primarily responsible for the final analyses and content of each are listed below:

Chapter 1: Linda B. Fosburg, Ph.D.

Chapter 2: Linda B. Fosburg, Ph.D.

Appendices: (A) Linda B. Fosburg, Ph.D.
(B) David C. Hoaglin, Ph.D.
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Chapter 3: Linda B. Fosburg, Ph.D., John H. Himes, Ph.D., and Michael Weitzman, M.D.

Chapter 4: Janet Smith

Chapter 5: Nancy N. Goodrich, Ed.D. and John H. Himes, Ph.D.

Chapter 6: Mary Kay Fox, R.D.

Chapter 7: Patricia Granahan, D.Sc.

Chapter 8: Linda B. Fosburg, Ph.D.

Chapter 9: Nancy N. Goodrich, Ed.D.

Chapter 10: Nancy N. Goodrich, Ed.D.

Chapter 11: Nancy N. Goodrich, Ed.D.

I also especially thank David Hoaglin, Gerrit Nauta, Peter Wolff, Steven Fosburg and Walter Stellwagon for helping to edit these discrete chapters into a report.

Finally, I wish to express my gratitude to the project's administrative and secretarial staff. Sharon Pinkham was there in the beginning and has provided support in many ways during the final phases; Barbara Quinlan played a major role in managing production of the many drafts of this report; Lisa Wenzel has patiently produced draft after draft; and Ann Zwetchkenbaum has contributed to the final layout.

To the many more contributors who played less conspicuous, but no less important roles, we thank you. We are indebted to all for their energy, encouragements and contributions.

Linda B. Fosburg, Ph.D.
Project Director
March 1984

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AAI No. 84-13

THE EFFECTS OF
HEAD START HEALTH SERVICES:

REPORT
OF THE
HEAD START HEALTH EVALUATION

VOLUME II

March 15, 1984

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PS 014511

HHS-105-77-1042

Prepared for:
The Administration for Children, Youth and Families
Office of Human Development Services
Department of Health and Human Services
Washington, DC 20201

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CHAPTER TWO

APPENDIX NOTES

Appendix Note 2-1

Head Start Performance Standards

Appendix Note 2-1

Head Start Performance Standards

Subpart C-Health Services Objectives and Performance Standards

1304.2-1 Health Service general objectives

The general objectives of the health services component of the Head Start program are to:

(a) Provide a comprehensive health services program which includes a broad range of medical, dental, mental health and nutrition services to preschool children, including handicapped children, to assist the child's physical, emotional, cognitive and social development toward the overall goal of social competence.

(b) Promote preventive health services and early intervention.

(c) Provide the child's family with the necessary skills and insight and otherwise attempt to link the family to an ongoing health care system to ensure that the child continues to recieve comprehensive health care even after leaving the Head Start program.

1304.3-3 Medical and dental history, screening and examinations.

(a) The health service component of the performance standards plan shall provide that for each child enrolled in the Head Start program a complete medical, dental, and developmental history will be obtained and recorded, a thorough health screening will be given, and medical and dental examinations will be performed. The plan will provide also for advance parent or guardian authorization for all health services under this subpart.

(b) Health screenings shall include:

(1) Growth assessment (head circumference up to two years old) height, weight, and age.

(2) Vision testing.

(3) Hearing testing.

(4) Hemoglobin or hematocrit determination.

(5) Tuberculin testing where indicated.

(7) Based on community health problems, other selected screenings where appropriate, e.g., sickle cell anemia, lead poisoning, and intestinal parasites.

(8) Assessment of current immunization status.

(9) During the course of health screening, procedures must be in effect for identifying speech problems, determining their cause, and providing services.

(10) Identification of the special needs of handicapped children.

(c) Medical examinations for children shall include:

(1) Examination of all systems or regions which are made suspect by the history or screening test.

(2) Search for certain defects in specific regions common or important in this age group, i.e., skin, eye, ear, nose, throat, heart, lungs, and groin (inguinal) area.

1304.3-4 Medical and dental treatment.

(a) The plan shall provide for treatment and follow-up services which include:

(1) Obtaining or arranging for treatment of all health problems detected. (Where funding is provided by non-Head Start funding sources there must be written documentation that such funds are used to the maximum feasible extent. Head Start funds may be used only when no other source of funding is available.)

(2) Completion of all recommended immunizations--diphtheria, pertussis, tetanus (DPT), polio, measles, German measles. Mumps immunization shall be provided where appropriate.

(3) Obtaining or arranging for basic dental care services as follows:

(i) Dental examination

(ii) Services required for the relief of pain or infection.

(iii) Restoration of decayed primary and permanent teeth.

(iv) Pulp therapy for primary and permanent teeth as necessary.

(v) Extraction of non-restorable teeth.

(vi) Dental prophylaxis and instruction in self-care oral hygiene procedures.

(viii) Application of topical fluoride in communities which lack adequate fluoride levels in the public water supply.

(b) There must be a plan of action for medical emergencies.

1304.3-5 Medical and dental records.

The plan shall provide for: (a) the establishment and maintenance of individual health records which contain the child's medical and developmental history, screening results, medical and dental examination data, and evaluation of this material, and up-to-date information about treatment and follow-up; (b) forwarding, with parent consent, the records to either the school or health delivery system or both when the child leaves the program; and (c) giving parents a summary of the record which includes information on immunization and follow-up treatment; and (d) utilization of the Health Program Assessment Report (HPAR); and (e) assurance that in all cases parents will be told the nature of the data to be collected and the uses to which the data will be put, and that the uses will be resticted to the stated purposes.

1304.3-6 Health education.

(a) The plan shall provide for an organized health education program for program staff, parents and children which ensures that:

(1) Parents are provided with information about all available health resources;

(2) Parents are encouraged to become involved in the health care process relating to their child. One or both parents should be encouraged to accompany their child to medical and dental exams and appointments;

(3) Staff are taught and parents are provided the opportunity to learn the principles of preventive health, emergency first-aid measures, and safety practices;

(4) Health education is integrated into ongoing classroom and other program activities.

(5) The children are familiarized with all health services they will receive prior to the dulivery of those services.

1304.3-8 Mental health services.

(a) The mental health part of the plan shall provide that a mental health professional shall be available, at least on a consultation basis, to the Head Start program and to the children. The mental health professional shall:

(4) Advise and assist in developmental screening and assessment;

(5) Assist in providing help for children with atypical behavior or development, including speech.

1304.3-9 Nutrition objectives.

The objectives of the nutrition part of the health services component of the Head Start program are to:

(a) Help provide food which will help meet the child's daily nutritional needs in the child's home or in another clean and pleasant environment, recognizing individual differences and cultural patterns, and thereby promote sound physical, social, and emotional growth and development.

(b) Provide an environment for nutritional services which will support and promote the use of the feeding situation as an opportunity for learning;

(c) Help staff, child and family to understand the relationship of nutrition to health, factors which influence food practices, variety of ways to provide for nutritional needs and to apply this knowledge in the development of sound food habits even after leaving the Head Start program;

(d) Demonstrate the interrelationships of nutrition to other activities of the Head Start program and its contribution to the overall child development goals; and

(e) Involve all staff, parents and other community agencies as appropriate in meeting the child's nutritional needs so that nutritional care provided by Head Start complements and supplements that of the home and community.

1304.3-10 Nutrition services.

(a) The nutrition services part of the health services component of the performance standards plan must identify the nutritional needs and problems of the children in the Head Start program and their families. In so doing account must be taken of:

(1) The nutrition assessment data (height, weight, hemoglobin/hematocrit) obtained for each child;

(2) Information about family eating habits and special dietary needs and feeding problems, especially of handicapped children; and

(3) Information about major community nutrition problems.

(b) The plan, designed to assist in meeting the daily nutritional needs of the children, shall provide that:

(1) Every child in a part-day program will receive a quantity of food in meals (preferably hot) and snacks which provides at least 1/3 of daily nutritional needs with consideration for meeting any special needs of children, including the child with a handicapping condition;

(2) Every child in a full-day program will receive snack(s), lunch, and other meals as appropriate which will provide 1/2 to 2/3 of daily nutritional needs depending on the length of the program;

(3) All children in morning programs who have not received breakfast at the time they arrive at the Head Start program will be served a nourishing breakfast.

(4) The kinds of food served conform to minimun standards for meal patterns;

(5) The quantities of food served conform to recommended amounts indicated in CCD Head Start guidance materials; and

(6) Meal and snack periods are scheduled appropriately to meet children's needs and are posted along with menus; e.g., breakfast must be served at least 2 1/2 hours before lunch, and snacks must be served at least 1 1/2 hours before lunch or supper.

Appendix Note 2-2

Information for Interpreting Tables of Regression Results

Appendix Note 2-2

Information for Interpreting Tables of Regression Results

Results of regression analyses have been reported in a standardized format across chapters. In all analyses, selected covariates were first entered into the equation to adjust for background differences in the samples. Covariates are listed in a table footnote, but the tables do not report coefficients or standard errors for individual covariates.

Effects-coded site variables (see Technical Appendix 2B, p. 15) were included in the cross-site analyses. The effects (b) and their standard errors (se_b) are reported for the first three sites; the coefficient for the fourth site (Mingo County) can be determined by subtracting the sum of the other site effects from zero. Significant site effects are indicated by asterisks (* = $p < .05$; ** = $p < .01$).

After adjusting for covariate and site differences, a dichotomous Head Start variable (0 = non-Head Start, 1 = Head Start) was entered; a positive coefficient (b) therefore indicates a positive Head Start effect of size b (see Technical Appendix 2B, p. 14). If the effect was significant, an asterisk (* or **) was added to the coefficient. Head Start effects are repeated after the site effects in cross-site analyses. Tables for within-site analyses for each sample, which follow several pages of cross-site statistics, report the value and standard error only for the within-site Head Start effect.

The F-statistic, R-squared (variance accounted for), and residential mean square also are reported for each analysis (both across and within sites). These statistics are based on the entire regression equation, including covariates. Thus, a significant F does not necessarily reflect a significant Head Start effect.

CHAPTER TWO

APPENDIX TABLES

Table 2-1

Comparisons of Head Start Health Services Delivered According to the Local PIR[a] and Regional (National) Averages[b]

		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		PIR	Regional Average	PIR	Regional Average	PIR	Regional Average	PIR	Regional Average	PIR	National Average
Total Enrollment		620		899		458		345		2322	
Percent Children with Medicaid	n %	193/620 31.3	32.5	684/899 76.1	59.5	d	56.9	138/345 40.0	51.5	1017/2322 43.8	47.2
Medicaid Percent Receiving Medical Screens Paid by Medicaid	n %	No Info.	80.0	684/684 100.0	85.0	d	88.0	38/138 27.5	80.3	722/822[c] 87.8	81.5
Medicaid Percent with Medical Findings	n %	No Info.	22.7	26/684 3.8	20.3	d	17.4	34/138 24.6	26.6	60/822[c] 7.3	22.8
Medicaid Percent Receiving Medical Treatment Paid by Medicaid	n %	No Info.	88.5	26/26 100.0	84.2	d	85.3	10/34 29.4	86.5	36/60[c] 60.0	7/13 85.8
Medicaid Percent Receiving Dental Examination Paid by Medicaid	n %	No Info.	61.5	613/684 89.6	69.6	d	58.5	138/138 100.0	66.8	751/822[c] 91.4	63.7
Medicaid Percent with Dental Findings	n %	No Info.	42.5	52/684 7.6	28.1	d	28.3	50/138 36.2	35.2	102/822[c] 12.4	32.9
Medicaid Percent Receiving Dental Treatment Paid by Medicaid	n %	No Info.	88.9	52/52 100.0	80.5	d	90.7	47/50 94.0	82.5	99/102 97.1	84.7

[a] Base is total actual local enrollment reported in Program Information Record in all programs except for Friends of Children. The latter pertains to Greene and Humphreys Counties only.

[b] Base is total grantees in region.

[c] Excluding Greene and Humphreys Counties.

[d] There was no Medicaid program in Maricopa County prior to and during the evaluation.

Table 2-2

Comparisons of Head Start Health Services Delivered According to the Local PIR[a], the Abstract of Local Health Records of the Evaluation of Children[b], and Regional (National) Estimates[c]

		Greene & Humphreys Counties		St. Clair County		Maricopa County[e]		Mingo County		All Sites	
		PIR	Abstract Records	PIR	Abstract Records	PIR	Abstract Record	PIR	Abstract Records	PIR	Abstract Records
Total Enrollment		620	127	899	108	458	102	345	112	2322	449
Percent Children with Medicaid	n %	195/620 31.5	49/127 38.6	684/899 76.1	73/108 67.6	0	0	138/345 40.0	30/112 26.8	1017/2322 43.8	152/449 33.9
Medicaid Percent Receiving Medical Screens Paid by Medicaid	n %	No Info.	33/49 67.3	684/684 100.0	68/73 93.2			38/138 27.5	23/30 76.7	722/822[d] 87.8	124/152 81.6
Medicaid Percent with Medical Findings	n %	No Info.	9/49 18.4	26/684 3.8	2/73 2.7			34/138 24.6	2/30 6.7	60/822[d] 7.3	13/152 8.6
Medicaid Percent Receiving Medical Treatment Paid by Medicaid	n %	No Info.	6/9 66.7	26/26 100.0	0/2 0.0			10/34 29.4	1/2 50.0	36/60[d] 60.0	7/13 53.8
Medicaid Percent Receiving Dental Examination Paid by Medicaid	n %	No Info.	31/49 63.3	613/684 89.6	68/73 93.2			138/138 100.0	18/30 60.0	751/822[d] 91.4	117/152 77.0
Medicaid Percent with Dental Findings	n %	No Info.	6/49 12.2	52/684 7.6	34/73 46.6			50/138 36.2	3/30 10.0	102/822[d] 12.4	43/152 28.3
Medicaid Percent Receiving Dental Treatment Paid by Medicaid	n %	No Info.	5/6 83.3	52/52 100.0	21/34 61.8			47/50 94.0	3/3 100.0	99/102 97.1	29/43 67.4

[a] Base is total actual local enrollment reported in Program Information Record except for Greene and Humphreys Counties which is the disaggregated numbers specific to those counties.

[b] Base is total Head Start group included in evaluation and percentage reflects medical examinations, only.

[c] Base is total grantees in region.

[c] Base is total grantees in region.

[d] Excluding Greene and Humphreys Counties.

[e] Arizona does not have a Medicaid program, consequently, there are no children covered by that program in Maricopa County.

CHAPTER FOUR

APPENDIX NOTES

Appendix Note 4-1

Use of dmf Index vs. Other Alternatives

Appendix Note 4-1

Use of dmf Index vs. Other Alternatives

The selection of dmf index for use in analyzing and presenting the dental evaluation findings was a judgment call. Besides this summative measure of dental services, we included other measures which should be sensitive to receipt of services, e.g., the plaque index, and also presented each factor (d,m,f) separately.

We recognized that dmf combines variables, some indicative of receipt of dental services and some indicative of the lack of services. We considered alternatives, but none were as satisfactory given the distribution of the data collected in this evaluation.

The ratio $\frac{f}{d+f}$ results in the following distribution of values for children:

Values	
0	77%
.001-.999	17%
1	6%

and $\frac{d}{d+f}$ results in the following distribution of values for children:

Values	Greene & Humphrey Counties	St. Clair County	Maricopa County	Mingo County
0	6.1%	37.2%	48.2%	28.9%
.001-.999	11.9	4.2	25.3	31.6
1	81.9	58.6	26.5	60.5

CHAPTER SIX

APPENDIX NOTES

Appendix Note 6-1

Preliminary Analyses to Evaluate Potential Biases Resulting From Use of Direct Observation Methodology to Gather Data on Meals and Snacks Served in Head Start Centers

Appendix Note 6-1

This Appendix reports results of preliminary analyses undertaken to assess the impact of using the observation methodology in gathering data on foods consumed by children during the hours they attended Head Start. Although one could evaluate both the 24-hour recall data and the observation data from a number of different perspectives, the analyses reported here were structured to determine whether or not there was any systematic bias in the observation data that would have favored Head Start and produced artifactual Head Start effects. It was hypothesized that such a bias could have occurred as a result of one or both of the differences in protocol, as described previously. That is:

- observation data could favor Head Start simply because all foods consumed had been recorded as they were observed. Since mothers had to recall what foods their children had eaten on the previous day, they may have forgotten, or indeed not seen, some foods;
- observation data may have resulted in larger portion sizes, and thereby greater nutrient contributions, since observers were able to weigh and measure foods to determine accurate average serving sizes before meals were served to the children.

Problems due to poor memory on the part of the mother cannot be fully assessed. However, it is believed that potential bias resulting from such difficulties was minimal. Every effort was made to prompt mothers' recalls in a non-leading fashion, and considerable effort was expended to obtain data from other persons on foods that might have been consumed by children when they were not in their mother's care or when mothers were not observing their child's food consumption. Previous investigators have noted that there is generally good agreement between the foods that are reported in 24-hour recalls and foods that were actually consumed (Emmons and Hayes, 1973; Linusson, Sanjur and Eriskcon, 1974; Young, 1981).

Problems are more likely to result from inaccuracies in describing portion sizes of foods consumed and the resultant discrepancies in computed nutrient content of the total diet. Several investigators have reported the tendency for respondents to overestimate small intakes and underestimate larger intakes, resulting in an overall decrease in the number of persons in the sample with very high or low intakes (Linusson, Sanjur and Eriskcon, 1974;

Madden, Goodman and Guthrie, 1976; Gersovitz, Madden and Smiciklas-Wright, 1978). This effect has been termed the "flat-slope syndrome." Despite this problem, investigators have found that the data obtained through 24-hour recalls provide reasonably accurate measures of mean nutrient intake at the group level (Gersovitz, Madden and Smiciklas-Wright, 1978; Madden, Goodman and Guthrie, 1976).

Estimation of portion sizes through the observation methodology is unlikely to result in a "flat slope syndrome" and, simply due to the hands-on nature of the methodology, is likely to result in more accurate descriptions of the portions of food consumed. The observation methodology used in this evaluation was adapted from one developed by Abt Associates for an evaluation of the Nutrition, Education and Training (NET) Program for the U. S. Department of Agriculture. Analyses undertaken for that study reported a correlation of approximately 0.93 between estimates made by observers and the actual portion sizes (Comstock, St. Pierre and Mackiernan, 1981).

Given these circumstances, it was hypothesized that any bias in the data due to the use of the observation methodology in Head Start centers that would favor Head Start and produce invalid findings would result from a systematic upward bias in the total portion size of foods reported (since observers would not tend to underestimate larger portions of food, as respondents in 24-hour recalls tend to do). In structuring analyses to determine whether any such bias existed in the data, the following steps were taken:

- the gram weight equivalent of mothers' reported portion sizes (using the food model system) were computed;*
- individual foods were aggregated for both recalls and observations into twenty-one major food groups;**
- the average gram weight in each of the major food groups was computed for both recall and observation data. (Recall data for Head Start-absent and non-Head Start children were evaluated separately).

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*Meal observation data were already recorded in gram weights.

**Milk and milk drinks; creams; milk deserts; cheeses; meat, poultry, fish; eggs and egg mixtures; legumes, nuts, seeds; bread, crackers, bread products; cakes, cookies, pastries; ready-to-eat cereals; grains; citrus fruits and juices; non-citrus fruits and juices; potatoes; dark green vegetables; yellow vegetables; other vegetables; mixed dishes; fats; sugar and sweets; and beverages (not including milk or juice).

Average portion sizes from observations and recalls were then compared on three levels:

- overall average--the average portion size in each of the twenty-one food groups, determined by averaging all meals and snacks. The observation data for the Head Start-present group was compared to recall data for both the Head Start-absent group and the non-Head Start group;
- average portion sizes based on lunch meals only--comparison of Head Start-present versus each of the other two groups;
- average portion sizes for same group of children--Head Start observation versus the at-home recall. (The Head Start-absent subgroup who had valid but incompatible observations were used in this comparison.)

Results of all analyses revealed that there were no significant biases in portion size estimations that would have favored Head Start meals and snacks and thus produced erroneous results in the nutrition analyses. In fact, as Exhibits 6A-A through 6A-C show, any significant differences in portion size detected were in a direction that would have favored at-home intakes (Head Start-absent and non-Head Start groups) rather than observations (Head Start-present group). That is, where significant differences in portion size existed, they were consistently due to larger portion sizes reported in the recall data set.

These preliminary analyses successfully demonstrate that it is unlikely that the significant and positive differences noted for the Head Start-present group in this evaluation were due to some bias in the data produced by use of the observation methodology in Head Start centers. In fact, it seems as though the size of the differences may actually have been somewhat masked by the tendency for portion sizes reported in recalls to be larger than observed portion sizes. Whether this difference in portion sizes is an anomoly produced by the food model system used in collecting 24-hour recall data, is an example of a tendency for respondents to overestimate small portions, or is in fact illustrative of a tendency for children to eat more at home and less at Head Start cannot be evaluated with the available data.

Exhibit 6A-A

Overall Average Portion Sizes in Eighteen Major Food Groups[a] by Data Collection Methodology

Food Group		Recalls[b]	Observations	Significance[c]
Milk/Milk Drinks:	Average portion size[d]	184.71	174.33	0.097
	n	256	231	
Milk Deserts:	Average portion size	77.66	67.05	0.220
	n	49	40	
Cheeses:	Average portion size	35.42	15.22	0.000
	n	62	33	
Meat/Poultry/Fish:	Average portion size	54.15	46.90	0.017
	n	263	204	
Eggs/Egg Mixtures:	Average portion size	71.71	50.94	0.000
	n	130	80	
Legumes/Nuts/ Seeds:	Average portion size	61.04	39.05	0.001
	n	121	73	
Bread/Crackers, etc:	Average portion size	34.88	21.81	0.000
	n	248	261	
Cakes/Cookies/ Pastry:	Average portion size	40.13	25.62	
	n	128	69	
Ready-to-Eat Cereals:	Average portion size	64.70	53.29	0.000
	n	187	92	
Grains:	Average portion size	142.18	73.41	0.000
	n	66	73	
Citrus Fruits/ Juices:	Average portion size	184.07	87.58	0.000
	n	109	140	
Non-Citrus Fruits/ Juices:	Average portion size	123.81	67.49	0.000
	n	102	221	
Potatoes:	Average portion size	51.13	47.27	0.462
	n	165	48	
Dark Green Vegetables:	Average portion size	60.77	42.27	0.074
	n	26	41	
Deep Yellow Vegetables:	Average portion size	88.88	42.35	0.064
	n	17	50	
Other Vegetables:	Average portion size	59.89	34.34	0.000
	n	142	182	
Fats:	Average portion size	7.85	6.01	0.002
	n	167	135	
Sugar and Sweets:	Average portion size	28.69	12.52	0.000
	n	178	107	

[a] Only those food groups for which there were five or more cases in each category (recall and observation) are reported here.

[b] Based on 24-hour recalls for Non-Head Start group.

[c] Based on 2-tailed t-tests.

[d] Gram weights.

Exhibit 6A-B

Average Portion Sizes in Sixteen Major Food Groups[a] for Lunch Meals by Data Collection Methodology

Food Group		Recalls[b]	Observations	Significance[c]
Milk/Milk Drinks:	Average portion size[d]	204.11	191.18	0.214
	n	64	251	
Milk Deserts:	Average portion size	67.95	91.40	0.304
	n	5	32	
Meat/Poultry/Fish:	Average portion size	52.83	55.40	0.543
	n	157	188	
Eggs/Egg Mixtures:	Average portion size	100.00	46.12	0.000
	n	7	8	
Legumes/Nuts/ Seeds:	Average portion size	50.22	65.10	0.193
	n	43	63	
Bread/Crackers/ etc.:	Average portion size	40.08	23.09	0.000
	n	175	211	
Cakes/Cookies/ Pastry:	Average portion size	45.71	28.88	0.073
	n	17	41	
Ready-to-eat Cereals:	Average portion size	68.84	60.50	0.749
	n	15	5	
Grains:	Average portion size	157.09	73.41	0.001
	n	25	73	
Citrus Fruits/ Juices:	Average portion size	209.59	51.73	0.000
	n	21	30	
Non-Citrus Fruits/ Juices:	Average portion size	141.49	60.29	0.000
	n	19	87	
Potatoes:	Average portion size	40.55	54.21	0.000
	n	34	45	
Dark Green Vegetables:	Average portion size	68.36	42.27	0.000
	n	8	41	
Other Vegetables:	Average portion size	80.89	39.24	0.011
	n	53	177	
Fats:	Average portion size	8.10	8.70	0.000
	n	51	68	
Sugar and Sweets:	Average portion size	35.23	25.88	0.393
	n	29	33	

[a] Only those food groups for which there were five or more cases in each category (recall and observation) are reported here.

[b] Based on 24-hour recalls for Non-Head Start group.

[c] Based on 2-tailed t-tests.

[d] Gram weights.

Exhibit 6A-C

Average Portion Sizes for Eleven Major Food Groups[a] by Data Collection Methodology for the Same Group of Children[b]

Food Group		Recalls[b]	Observations	Significance[c]
Milk/Milk Drinks:	Average portion size[d]	183.53	190.53	0.635
	n	44	44	
Meat/Poultry/Fish:	Average portion size	56.37	38.23	0.019
	n	34	34	
Legumes/Nuts/Seeds:	Average portion size	37.49	36.65	0.939
	n	10	10	
Bread/Crackers/etc.:	Average portion size	40.03	21.85	0.000
	n	45	45	
Ready-to-Eat Cereals:	Average portion size	66.40	17.36	0.102
	n	11	11	
Citrus Fruits/Juices:	Average portion size	163.93	92.14	0.006
	n	14	14	
Non-Citrus Fruits/Juices:	Average portion size	116.92	84.68	0.065
	n	24	24	
Potatoes:	Average portion size	56.97	73.63	0.462
	n	7	7	
Other Vegetables:	Average portion size	38.37	27.42	0.317
	n	20	20	
Fats:	Average portion size	9.31	7.43	0.348
	n	9	9	
Sugar and Sweets:	Average portion size	23.11	27.06	0.557
	n	14	14	

---

[a] Only those food groups for which there were five or more cases in each category (recall and observation) are reported here.

[b] Recalls based on at-home intake for subset of children in the Head Start-absent group. Observations based on data for the same set of Head Start-absent children--those children who had valid but incompatible observation data. (See Chapter Six, section on Special Head Start Subgroups.)

[c] Based on 2-tailed t-tests.

[d] Gram weights.

Appendix Note 6-2

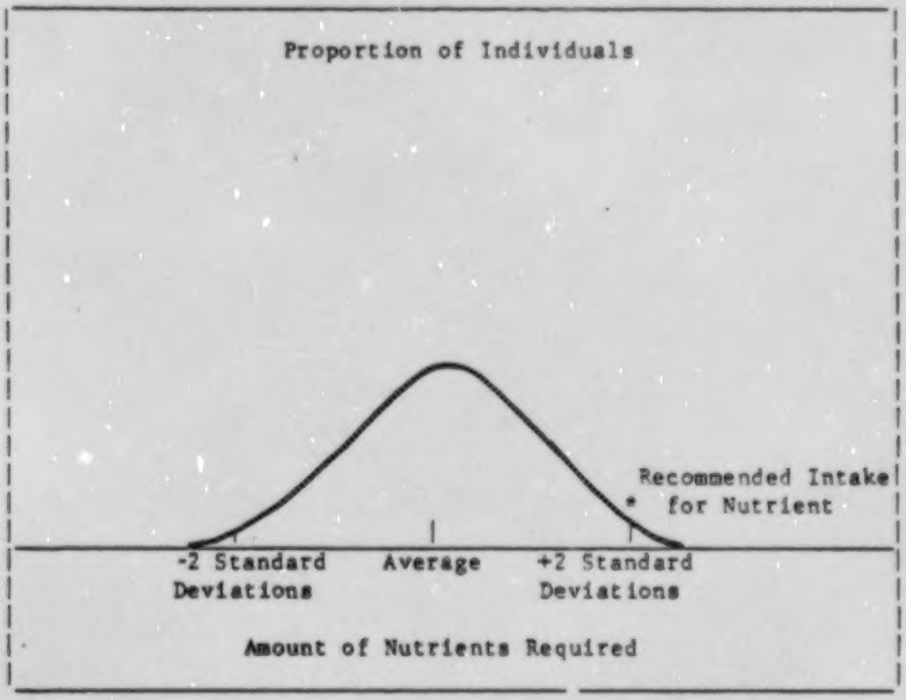
Notes on Appropriate Use of Reference Nutrient Intake Standards

The reader should note that the approach taken in using a set of reference standards to measure prevalence of nutrition problems in Head Start and non-Head Start groups differs greatly from that used in most other domains in the Head Start Health Evaluation. That is, the standards cannot be used as arbitrary cutoff points by which to measure whether individual children have "passed" or "failed" some measure of nutritional intake. There are several important reasons for this difference. First, the standards used in evaluating nutrient intake are based largely on the 1980 Recommended Dietary Allowances (see Appendix Note 6-3). These standards are, as the name implies, recommendations rather than requirements. These recommendations are oriented toward population groups rather than individuals. Thus, an individual whose nutrient intake fails to meet the recommended level on a particular day is not necessarily deficient in that nutrient. The practice of evaluating nutrient intake data in this manner, though somewhat commonplace, is an invalid use of the standards and frequently overestimates the prevalence of truly deficient intakes (Hegsted, 1975).

It is important to recognize that nutrient intake standards have been developed using the sometimes limited data available on actual nutrient requirements for particular age and sex groups. Frequently, little is known about the variability in individual requirements within these groups. Since evidence is available that many individuals may need more than the "average requirement" for any nutrient, and since recommendations must be set so that the needs of these individuals are met, nutrient intake standards are generally set well above the average requirement. That is, the standards are set at a level of intake expected to be "adequate to meet the known nutritional needs of practically all healthy persons" (Food and Nutrition Board, National Academy of Sciences, 1981). As such, the RDA may well exceed the actual requirements of many individuals. Exhibit 6A-D depicts the ideal approach taken in setting recommended levels of nutrient intake when sufficient evidence is available on the distribution of requirements within a population group. Theoretically, if nutrient requirements within age and sex groups followed a normal distribution, the recommended level of intake would be adequate to meet the needs of 97.5 percent of all individuals (and would exceed the needs of many of them). Thus, nutrient intake standards cannot be reliably used as cut-off points for identifying individuals consuming "inadequate" amounts of nutrients.

Exhibit 6A-D

Establishment of Recommended Levels of Nutrient Intake[a,b,c] Based on the Distribution of Nutrient Requirements Within a Population Group


Proportion of Individuals
Recommended Intake for Nutrient
-2 Standard Deviations
Average
+2 Standard Deviations
Amount of Nutrients Required

[a] Although sufficient information is not always available on the distribution of requirements within a group, this general approach--setting the standard well above the known "average requirement"--is routinely used in establishing nutrient intake standards.

[b] Recommended levels of caloric intake are generally set equal to the average requirement rather than at some level above that requirement. The sedentary lifestyle and prevalence of obesity in the U.S. generally decrease the caloric requirements of large numbers of individuals.

[c] Adapted from Beaton, 1981.

One can make reasonable judgments about the relative risk of inadequate intakes within a population group, however. That is, the risk of deficient intakes within a group increases as the average intake is less than the level recommended as safe for that population group (Food and Nutrition Board, National Academy of Sciences, 1981). Hence, the appropriate approach to describing the problem of marginal or deficient nutrient intakes in the groups of children evaluated here precludes computation of an actual prevalence estimate. Rather, the prevalence of marginal nutrient intakes can be addressed only in terms of potential risk of deficient intakes within the various groups of children examined.

The notion of group risk is especially appropriate for our analyses of Head Start's nutrition program because it accurately reflects Head Start's approach in this area. Meal service in Head Start, the major focus of the nutrition program, is a group function. The feeding of each individual child in Head Start is not contingent upon a battery of tests to determine the child's nutritional needs.* Instead, the aim of providing nutritionally adequate meals and snacks in the Head Start setting is to increase the likelihood that the average Head Start child's total daily intake will be at least at the RDA specified level for each essential nutrient. Such an approach should, as stated above, meet the needs of at least 97.5 percent of the Head Start children for all of the essential nutrients.

An additional rationale for not attempting to measure the adequacy of individual intakes stems from the nature of the dietary data used in this nutrition evaluation. The 24-hour recall is limited in its ability to accurately depict an individual's true food consumption habits (Beaton, 1981). The day-to-day variations in dietary intake are great, thus it would be naive to expect a description of food intake over a single 24-hour period to adequately characterize an individual's typical pattern of intake. Much research has been done on this issue, and it is commonly accepted that food consumption data must be collected over longer periods of time (three-day or seven-day food records, 24-hour recalls repeated over a period of time, or a complete dietary history) before nutrient intake profiles can reasonably be expected to characterize typical dietary practices for an individual (Beaton, 1981). Although the 24-hour recall is not adequate for individual-level analysis, it is routinely used in characterizing nutrient intake patterns of specific population groups. Hence, even if one were to disregard the previously identified problems associated with using recommended nutrient intake standards in evaluating the adequacy of individual intakes, one would have to accept the fact that nutrient data obtained through 24-hour recall would not support such analyses.*

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*Head Start Performance Standards do call for individual assessment of nutritional need. Such assessments are done on a varying basis from site to site (see section on Head Start's nutrition services), and sometimes lead to family referrals--for example, to WIC--for additional food assistance. Such assessments do not, however, generally lead to individualized meal service in Head Start centers for designated children.

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*Some progress has been made recently in attempting to develop more accurate approaches to estimating the prevalence of individuals with deficient nutrient intakes. A primary requirement for such analyses, however, is that the nutrient intake data accurately reflect typical intake patterns (including some assessment of day-to-day variation). Data from single 24-hour recalls are unfortunately not sufficient for such analyses (Beaton, 1981).

Appendix Note 6-3

Reference Standards Used in the Nutrition Evaluation

Exhibit 6A-E

Nutrient Intake Standards Used in Nutrition Evaluation[a]

Nutrient	2-3 year olds	4-6 year olds
Calories (kcal per kg body weight)b	82.0	82.0
Protein (gm per kg body weight)[b]	1.5	1.5
Calcium (mg/day)[c]	800.0	800.0
Iron (mg/day)[c]	15.0	10.0
Magnesium (mg/day)[c]	150.0	200.0
Phosphorus (mg/day)[c]	800.0	800.0
Vitamin A (I.U./day)[d]	2000.0	2500.0
Thiamin (mg/1000 kcal)[b]	0.4	0.4
Riboflavin (mg/1000 kcal)[b]	0.5	0.5
Niacin (mg/1000 kcal)[b,e]	6.6	6.6
Vitamin B_6 (mg/day)[c]	0.9	1.3
Vitamin B_{12} (mg/day)[c]	2.0	2.5
Vitamin C (mg/day)[c]	45.0	45.0
Cholesterol (mg/day)	300.0	300.0

[a] RDA standards for carbohydrate and fat have not been established.

[b] Adapted from NHANES and TSNS standards, adjusting for total body weight (calories and protein) or total caloric intake (thiamin, riboflavin, niacin)--closely approximate average 1980 RDA values.

[c] 1980 RDA Standards.

[d] 1976 RDA Standard--based on I.U. of total Vitamin A value rather than retinol equivalents.

[e] Based on milligrams preformed niacin rather than niacin equivalents.

Exhibit 6A-F

Nutrient Density of RDA Reference Diet[a]
(Amount of nutrient per 1000 kilocalories)

Protein (gm)	17.6
Calcium (mg)	544.0
Iron (mg)	9.6
Magnesium (mg)	116.5
Phosphorus (mg)	544.0
Vitamin A value (I.U.)	1507.5
Thiamin (mg)	0.61
Riboflavin (mg)	0.60
Niacin (mg)	6.71
Vitamin B^6 (mg)	0.84
Vitamin B^{12} (mcg)	1.50
Vitamin C (mg)	31.5
Cholesterol (mg)	200.0

[a] Based on 1980 RDA standards for average caloric and nutrient intakes. Figures represent average of standards for 2- to 3-year old group and 4- to 6-year old group. Caloric standard = 1500 kcal.

Appendix Note 6-4

Detailed Description of the Contrast Coding Scheme Used For Multiple-Group Comparisons in the Nutrition Evaluation

The regression model used in the nutrition evaluation used a three-level, contrast-coded Head Start factor. In order to accurately describe potential Head Start effects and understand any differences noted among the three groups (Head Start-present, Head Start-absent, and non-Head Start), each basic regression model was elaborated into three versions--one for each comparsion between a pair of groups:

- Head Start-present group vs. non-Head Start group;
- Head Start-present group vs. Head Start-absent group; and
- Head Start-absent group vs. non-Head Start group.

Because the effects for the three groups require two degrees of freedom, the contrast variable for a comparison between a pair of groups must be accompanied by a second contrast variable (whose values are essentially determined by the first contrast variable). Exhibit 6A-G shows the pairs of variables used for the three types of group comparison.

Through each of the three iterations of the regression, all other covariates and factors in the model remained the same; thus, the final solution (constant, F statistic, R^2, residual mean squared error) was unchanged.

Exhibit 6A-G

Contrast Coding Schemes Used in Regression Analyses to Detect Differences Among the Three Treatment Groups[a]

Comparison	Major Contrast Variable	Additional Contrast Variable
Head Start-present vs. Non-Head Start	HS-P = +1 HS-A = 0 NHS = -1	HS-P = +1 HS-A = -2 NHS = +1
Head Start-present vs. Head Start-absent	HS-P = +1 HS-A = -1 NHS = 0	HS-P = +1 HS-A = +1 NHS = -2
Head Start-absent vs. Non-Head Start	HS-P = 0 HS-A = +1 NHS = -1	HS-P = -2 HS-A = +1 NHS = +1

[a] HS-P = Head Start-present group; HS-A = Head Start-absent group; NHS = Non-Head Start group

TECHNICAL APPENDIX 2A

IMPLEMENTATION OF THE EVALUATION DESIGN

Implementation of the evaluation design for the Head Start Health Evaluation took place in a series of stages, as shown previously in Table 1A-1. Stage I comprised the following activities: Head Start program selection (subsequently referred to as site selection), site preparation and development, and sample recruitment. At Stage II, preparation for data collection involved revision of a battery of measures, equipment procurement, team recruitment, staff training, and random assignment of samples. Stage III consisted of the pretest data collection and the follow-up of health problems. At Stage IV, activities centered on a second wave of sample recruitment and on preparations for the posttest data collection (equipment procurement, team recruitment, and staff training). Finally, Stage V consisted of the posttest data collection and follow-up of health problems.

Stage I Activities

Site Selection

Whereas it had originally been assumed that site selection for the Head Start Health Evaluation should both be random, and include enough sites to permit generalizations to policy relevant populations (e.g., all Head Start grantees and delegate agencies), it soon became apparent, based on other related undertakings (e.g., the First and Second Health and Nutrition Examination Surveys), that the cost of a similar undertaking would far exceed the available resources for this study. Ultimately, a large-scale random site selection strategy was abandoned in favor of a site sampling scheme that emphasized a balance among a preselected set of stratifying variables for typical Head Start sites and adequate sample size both within and between sites.

The pilot test for the Head Start Health Evaluation had raised several important issues which bore on the site selection strategy for the main study. In that pilot study a random sampling procedure, stratified by degree of urbanization (rural, middle-sized city, and large city) and region of the country (U. S. Department of Health and Human Services Regions I and IV) was used to select three pilot sites: one rural and one large city program from Head Start Region I and one middle-sized city program from Region IV. The principal condition required of a pilot site was that the health component be well implemented (in compliance with the Head Start Performance Standards). This was a self-evident constraint in that it made no sense to attempt to evaluate the impact of a program that was only poorly or partially implemented. In order to ensure that this condition was met, two additional sites (for each degree of urbanization) were randomly selected as alternate candidates in case the first (and second) site would prove to be unacceptable. Regional office personnel of the U.S. Department of Health and Human Services and the Head Start Health Liaison Specialist from Westinghouse Health Systems (contractor for Head Start health training and technical assistance) were independently asked to identify acceptable sites and, further, to denote the best of the three randomly selected sites for each stratum. According to these expert sources, only five of the nine sites were considered acceptable in terms of the degree of implementation of their health components and the administrative stability of the Head Start program. Furthermore, there was consensus on the selection of the three best sites.

From this experience, it was evident that selection of sites at random was likely to yield some sites which were not in compliance with the Head Start Performance Standards for the health component, and these would be poor subjects for this evaluation. Inclusion of such sites would weaken the study's potential for finding health impacts. The sampling approach adopted for the main study was equivalent to rephasing the evaluation question to be "What are the expected impacts of a well-implemented Head Start health component?"

The pilot study also showed that Head Start programs are heterogeneous in many respects--the populations served, the health and nutritional needs of the children, and the health services provided. Consequently, pooling data on children across sites could result in problems of interpretation or misleading findings. For example, strong effects at one site might be obscured by null or negative effects at another. To maximize the ability to detect program impacts on a site-by-site basis (and to examine the interrelationship between site characteristics and impacts), adequate sample sizes of children at each site would be needed. In order to compute within-site sample requirements, we examined the variety of health problems under consideration to determine the prevalence of each problem in the target population and the amount of change in these problems that one might expect over the course of a Head Start program year. A sample of 125 participants and 125 non-participants per site was deemed to be adequate to assess those health services and conditions that affect large numbers of Head Start children. We recognized, however, that this within-site sample size would effectively preclude the evaluation from assessing how Head Start deals with some health problems that affect only a small proportion of the population. In order to obtain a final sample of 250 children, given possible attrition, the evaluation proposed to recruit an initial sample of 300 children at each site. Thus, in the event of large site variation on important variables, the sample size within each site would be large enough to support inferences about Head Start impacts separately for each site.

The characteristics and number of sites to be included in the evaluation was the subject of lengthy discussions between the evaluation staff and the Administration for Children, Youth and Families. It was recognized that the use of a data collection team of health specialists to collect health data (e.g., pediatricians for general pediatric health, pedodontists for dental health, and audiologists for hearing) would be costly and would thus limit the number of evaluation sites or result in very small samples of children in each of a larger number of sites. After much consideration of alternative strategies, available resources permitted implementation of the evaluation in four Head Start sites on approximately 250 children per site.

Several site and program characteristics were used to select the four sites:

- urban versus rural setting;
- region of the country;
- strength of local health care system and availability of free or subsidized health care for Head Start eligibles;
- ethnicity of the Head Start population;
- size of the Head Start program; and
- strength of Head Start health services locally.

The rationale for using this set of characteristics was as follows. On average, rural areas have fewer physicians and hospitals per capita. When combined with the greater distances that must be travelled in order to obtain services, access to health care is often substantially worse in rural rather than in urban sites. Since a substantial portion of Head Start programs serve rural areas, it was necessary to represent such sites in this evaluation.

Region of the county has a subtler influence. Although available health care services vary widely across regions, the variation within a region is also very great. Thus, although it was possible to obtain, within some regions, a sample representative of the range of health care services, it was preferable to select a balanced sample of sites across regions to improve the face validity of the sample used for the evaluation.

The strength of the local health care system and the availability of free or subsidized health care services for the poor vary widely across the nation. Some areas have large numbers of doctors and clinics, while others have few. In many areas, health services are so uneven that one or more vital services may not be available locally. (For example, one of the selected sites had no dentist within easy reach.) Further, although in some areas nearly all Head Start children were eligible for Medicaid, this was not universally the case and in one site, there was no Medicaid program. Since, when an alternative health delivery service is available, Head Start simply mediates the delivery of the needed health care, the absence of such alternatives within a community invariably increases the management and resource burden on the local Head Start program. A comprehensive examination of the Head Start health care system thus had to take account of this important local variation in health care resources.

During the program year, 1980-81, the Head Start children served were 42 percent black, 33 percent white, and 20 percent Hispanic. To reflect this distribution, two predominately black, one white, and one Hispanic site were appropriate, given a total of four sites.

In addition, the size of the Head Start program was an important site selection criteria. Given an initially estimated within-site sample size requirement to recruit 150 Head Start and 150 comparison children (to allow for attrition), only large Head Start programs, serving more than 300, were chosen for participation in the study. Further, to increase the probability of identifying Head Start impacts on the health status of low-income children, selection was also limited to Head Start programs with well-implemented health and nutrition programs that were in compliance with the Head Start Performance Standards for the health component. Thus, Head Start sites were excluded from consideration if they were known to have weak health components. (While a process study examining Head Start services could be conducted in such sites, most of the major study issues could not be appropriately addressed.) No attempt, however, was made to identify Head Start programs with "model" health components. Instead sites were considered if the Head Start management information system, the Program Information Record (PIR), showed that the health program at that site was, by and large, operating competently and in a manner "typical" of that region. Thus, "typical" sites were selected, not so much to "represent" all Head Start programs but to evaluate standard health services delivery in the presence of the range of contextual factors which confront Head Start. Westinghouse Health Systems (the technical assistance contractor for the Head Start health services) and the U. S. Department of Health and Human Services regional offices also provided the assessments of the Head Start health services delivered in candidate sites for the Head Start Health Evaluation.

These criteria led to the selection of the following four sites:

- Greene County (Leakesville) and Humphreys County (Belzoni), Mississippi;
- St. Clair County (East St. Louis), Illinois;
- Maricopa County (Phoenix), Arizona; and
- Mingo County (Williamson), West Virginia.

Exhibit 2A-1 shows some of the distinguishing characteristics of the four programs selected for the evaluation.

Exhibit 2A-1

Characteristics of the Four Head Start Programs
Selected for the Head Start Health Evaluation

Program Characteristics	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Predominant Ethnicity of Children Enrolled	Black	Black	Hispanic	White
Degree of Urbanization of Local Community	Rural	Urban	Urban	Rural
Number of Years Children Enrolled	Two to three years	Two to three years	One year (with one-year Home-Based program prior to center enrollment for some children)	Two years

Site Preparation and Development

Site preparation and development required close coordination and cooperation among regional office staff of the Administration for Children, Youth and Families, Head Start program staff, Head Start parents, health care professionals, and evaluation staff. The complexity of the evaluation design alone made implementation difficult. Logistics were a major undertaking, but they were essential to successful implementation of the study.

To conduct the evaluation, it was necessary to gain support for the study, first from the regional offices of the Administration for Children, Youth and Families (U. S. Department of Health and Human Services) and from the local Head Start programs. This process began immediately after the national office of the Administration for Children, Youth and Families made the final selection of first-choice of Head Start programs for longitudinal evaluation sites. To this end, several visits were made to each of the four Head Start programs to brief policy councils, health advisory panels, and program staff on study objectives, the design, and other details of the study (e.g., random assignment, health measures, and follow-up of urgent health problems). Recognizing the limitations of a solely verbal presentation of a complex evaluation strategy such as the Head Start Health Evaluation, a slide presentation was prepared as a visual aid to briefing various audiences. The slides contained graphic presentations of the stages of the evaluation with photographs of children receiving each portion of the health evaluation, and parents being interviewed. Following extensive site development work, all four Head Start programs that were selected agreed to participate in the study.

A critical task in this process was to negotiate acceptable procedures with each local Head Start program for the random assignment of Head Start-eligible children to either Head Start or a non-Head Start comparison group. This was essential because the potential strength of the design for the longitudinal study depended critically on the feasibility of implementing random assignment of children into Head Start and non-Head Start groups.

Implementation of random assignment procedures was difficult and raised many concerns: parents about the effect on their children and Head Start directors about the impact on the Head Start program itself. Questions were raised about the ethics of withholding services from children who require them. Our approach was simple and direct. We explained that without random assignment it would be difficult to provide conclusive evidence of Head Start impacts. Second, we discussed the fact that each site had many more Head Start-eligible children than the program could serve, and consequently some children would not be able to enroll. Any selection procedure applied to all Head Start-eligible children would fill all of the available Head Start enrollment positions but would leave numerous children outside the program's services. Furthermore, it was pointed out that participation in the evaluation meant that both Head Start children and non-Head Start comparison children would receive an extensive health evaluation at least once during the study, thereby extending health benefits to all participating children. For some non-Head Start children, the benefits of participation in the study would go beyond the health evaluation. If deemed severely in need of health services at either pre- or posttest, non-Head Start children would be referred for services which would be paid for through a special grant to the Head Start programs.

The evaluation staff and Head Start program staff reached several other important agreements. Head Start agreed to reserve 150 slots for children recruited for the Head Start Health Evaluation. It was understood, however, that evaluation staff would be responsible for sample recruitment and for filling those slots. Head Start staff, on the other hand, would recruit additional children for entry into the program to fill slots not reserved for the study. Any child, diagnosed as handicapped and recruited by the evaluation staff, was referred directly to Head Start for participation in the program but not in the evaluation. Agreement was also reached with Head Start that parental refusal to participate in the study did not necessarily exclude the child's entry into Head Start. That is, parents could apply for enrollment into Head Start, although no guarantees would be given that the child would be accepted. Non-Head Start children who remained in the comparison group during the evaluation and who desired entry into Head Start after completion of the posttest data collection would be given priority.

Sample Recruitment

The next task in site development was the identification and recruitment of 300 Head Start-eligible children in each of the four sites. Only children who were eligible to enter Head Start in fall 1980, who had not previously been professionally diagnosed as handicapped and had no prior Head Start experience were included. (Families with prior Head Start experience, however, were not excluded from participation in this study.)

Because the recruitment process was lengthy and required an extensive knowledge of the community, a group of local evaluation assistants were hired. Their primary responsibility was to identify Head Start-eligible children and encourage their parents (or guardians) to participate in the study. In addition, they served as liaison with the local Head Start program. All evaluation assistants were familiar with the local Head Start program; several were former Head Start parents and some had served on Head Start policy councils.

Recruitment of a sample of the desired size required a variety of formal and informal approaches. The more formal approaches included contacting all social service and health care agencies (e.g., the county welfare department; Food Stamp center; Women, Infants, and Children (WIC) Supplemental Food program; county health department; and local health care clinics), as well as the Head Start program, to obtain referrals to families with children of the proper age eligible to enter Head Start in the fall of 1980. In most cases the social service and health care agencies were willing to recommend to families that they contact the evaluation assistant, but were unwilling to provide names of families without first obtaining the families' permission. Although it had been hoped that Head Start would have waiting lists which could be used in recruitment, these lists (if they existed at all) did not contain a substantial number of children.

Informal approaches, including word of mouth and direct canvassing, were also successful means for identifying Head Start-eligible children. In most sites, evaluation assistants went door-to-door to local families, asking parents with eligible children whether they knew of other families with children of the appropriate age.

An extensive public relations campaign was also conducted. Its aim was to give local residents an understanding of how and why the study was being done. This was accomplished through radio announcements, newspaper advertisements, and announcements in churches, supermarkets, and community agencies. Posters and brochures announcing "WHERE CHILD HEALTH IS CONCERNED, WE CAN HELP EACH OTHER" familiarized residents with study objectives and told what participation in the study would involve (see Figure 2A-1).

All leads were followed up by evaluation assistants, who screened each family for income eligibility, age of children, and other site-specific Head Start eligibility criteria, such as availability of transportation.

Figure 2A-1

Brochure Used to Familiarize Communities with the Head Start Health Evaluation and to Recruit Families into the Study

Where Child Health Is Concerned We Can Help Each Other...

We are conducting the Head Start Health Evaluation. This study is designed to determine whether the medical, dental and nutritional services provided by Head Start are helping:

- Head Start children,
- their families, and,
- their communities.

If your child will be three to five years of age in September 1980, and you think your child would be eligible for Head Start, we would like you and your child to participate in the study. Call the study representative:

Families found to be eligible for Head Start were given more detailed information about the study and the random assignment process and asked whether they were willing to participate.

Families were subsequently interviewed about a variety of demographic and family background characteristics. Completed interviews were sent to the central evaluation staff for processing. This interview provided the information needed to randomly assign the children within age, sex, and ethnicity strata to either Head Start or the non-Head Start comparison group.

Pretest sample recruitment took place from January through March 1980 and produced the following results. Sample recruitment, although nearly met in all sites, produced fewer than desired children with sufficient family and health information needed for the evaluation. At the time of the pretest data collection in April 1980, those children with at least a completed family background questionnaire numbered 277 in St. Clair County, 180 children in Greene and Humphreys Counties, 170 children in Mingo County, and only 130 in Maricopa County. This shortfall, coupled with expected additional attrition, meant that the recruitment period had to extend beyond the pretest in order to ensure adequate sample sizes for posttest data collection. Recruitment for the augmentation sample occurred in Stage IV of the evaluation (see Table 1A-3).

Stage II Activities

A number of activities took place simultaneously with sample recruitment by evaluation assistants in preparation for data collection. These included revision of the battery of measures based on pilot study results, procurement of equipment, recruitment and training of data collection staff, location of examination centers in each of the four sites, and random assignment of the sample of recruited children.

Revision of Measurement Battery

The measurement battery for the Head Start Health Evaluation was extensive and included instruments for recording information from each of the health evaluations of the child, as well as from the interviews with the child's parent. The health evaluation sections (described more fully in Appendix 1A) included:

- a pediatric health evaluation;
- a dental evaluation;
- an anthropometric evaluation;
- a hematologic evaluation;
- a developmental evaluation;
- a speech evaluation;
- a vision evaluation; and
- a hearing evaluation;

and the parent interviews included:

- a health history of the child;
- a nutrition evaluation; and
- questions about family background.

All of the instruments were administered on the day the child's health evaluation was conducted, except for the family background questionnaire.

Based on the results of the pilot study, revisions were made in the measurement battery. The extent of these revisions varied with the instrument. Some of the most extensive revisions were in the parent interviews--the family background questionnaire, health history, and nutrition habits questionnaire.

Equipment Procurement

A large portion of the equipment was either loaned or donated by merchants and corporations around the country. Exhibit 2A-2 lists the equipment obtained and the source of each piece. Many items required considerable advance planning, because the standard equipment might not meet the transportability needs of the data collection, or because there was a wide range of prices for similar equipment. For example, a height board or

Exhibit 2A-2

Equipment Procured for Pretest Evaluation

Data Collection Domain	Item	# Required	Source	Donated/ Purchased
Dental	Mirrors	35	Rower Dental Supply Division of Health Co., Inc., Boston, MA	Donated
	Mirror handles	35		Donated
	Explorers	35		Donated
	Liquid disclosing solution	3 bottled		Donated
	Cidex sterilizing solution	1 gallon		Donated
	Sterilizing basin	1		
	2X2 gauze sponges	12 boxes		Donated
	Cotton swabs	500		Donated
	Paper cups	500		Donated
	Good Lite™	1		Donated
	Bulbs for light	3		Purchased
	Mouth prop	1		Purchased
	Periodontic probes	6		Donated
	Bean bag chair	1	Local Store	Purchased
Hematology Collection	Large Centrifuge	1	Scientific Products Bedford, MA 01730	Purchased
	Cushions, shield for centrifuge	1 set		Purchased
	12-place head for centrifuge	1		Purchased
	Micro-hemotocrit centrifuge	1		Purchased
	Hematocrit capillary tube reader	1		Purchased
	Chart-type hematocrit reader	1		Purchased
	Supplies for blood draws, i.e., band-aids, gauze pads	Enough for four sites	University of Nebraska	Included in subcontract

Exhibit 2A-2 (continued)

Equipment Procured for Pretest Evaluation

Data Collection Domain	Item	# Required	Source	Donated/ Purchased
Anthropometry	Skinfold calipers	1	Pfister Import Carlstadt, NJ	Purchased
	Stadiometer	1	University of Nebraska	Purchased
	Scale, balance beam	1 1	Healthco Inc. Canton, MA	Purchased
	Ross Inser-tapes	4	Ross Labs.	Donated
	Growth charts	500	Ross Labs.	Donated
Vision	Classon projector	1	National Inst. of Health	Loaned
	Bulbs	3	Claus Gelotte Cambridge, MA	Purchased
	Phoropter & stand	1	New England School of Optometry Boston, MA	
	Slide projector	1	Abt Associates	Loaned
	Finger puppet	1	Local Store	Purchased
	Occluder patch	1	Plano Child Development Center Chicago, IL	Donated
	Biopter	1		Loaned
	Retinoscope	1		Loaned
	Photometer	1	Team Staff	Loaned
	Stereofly & glasses	1 set	Bernell, Inc. Long Island, NY	Purchased
	Ishihara color plate book	1		Purchased
	Keystone peek-a-boo test	1 set	Keystone, Inc.	Purchased
	Diagnostic set	1 set	Dr. Wilburn Lord	Loaned
	Batteries	3	Healthco, Inc. Canton, MA	Purchased
	Typing stand	1	Abt Associates	Loaned
	Paint brush	1	Local Store	Purchased
	Extension cords	1	Team Staff	Loaned

Exhibit 2A-2 (continued)

Equipment Procured for Pretest Evaluation

Data Collection Domain	Item	# Required	Source	Donated/ Purchased
Vision (continued)	Plug adapter	1	Team Staff	Loaned
	"Hand" slide	1	Local Store	Purchased
	Cartoon slides	1	Local Store	Purchased
Developmental	McCarthy test materials	1 set	Psychological Corporation	Purchased
Nutrition	Food models	6 sets	Alan Shapiro Baltimore, MD	Purchased
	Code books	6	Reproduced at AAI	Purchased
	Vitamin samples	6 sets	Various Manufacturers	Donated
Speech	ACLC test materials	1 set	Consulting Psychologists Press, Palo Alto, CA	Purchased
	Del Rio test materials	1 set	National Educational Laboratory Publishers, Austin, TX	Purchased
Audiology	Audiometer	1	Guinta Assoc. E. Hackensack, NJ	Loaned
	Tympanometer	1	American Electromedics Littleton, MA	Loaned
	Paper for Tympanometer stapler	12 rolls		Purchased
	Ring toy	1	Toy Store	Purchased
	Can of blocks	1	Toy Store	Purchased
Physical Exam	Pediatric blood pressure cuff	1	Healthco, Inc. Canton, MA	Donated Donated
	Diagnostic set	1	Team Pediatrician	Loaned
	Stethoscope	1	Team Pediatrician	Loaned
	Bean bag chair	1	Local Store	Purchased
Children's Incentives	T-Shirts	500	Bailey Sportswear, Boston, MA	Purchased

stadiometer, which cost about $650 when purchased from the manufacturer, could be handmade in plywood for under $200.

Biomedical Data Collection Team Recruitment

A team of approximately 20 persons was required to collect pretest data for the Head Start Health Evaluation. The team contained several health care professionals (pediatrician, pedodontist, optometrist, speech pathologist, audiologist, laboratory technologist, and four to five nutritionists). The remainder of the team was composed of two interviewers responsible for obtaining medical and dental histories, one developmental tester, a site coordinator, an assistant site coordinator, a quality controller, and three to five evaluation assistants and transportation coordinators. Exhibit 2A-3 lists the affiliations of the members of the biomedical team.

Exhibit 2A-3

Affiliations of Members of the Biomedical Team

Pediatricians	Associated Pediatricians of Boston (affiliated with Boston City Hospital)
Pedodontists	Children's Hospital Medical Center in Boston
Optometrists	Plano Child Development Center in Chicago; Private practice in Mississippi
Speech Pathologists	Private practice or university local to each Private practice in Mississippi
Speech Pathologists	Private practice or university local to each site and familiar with the dialect and colloquialisms
Audiologists	Children's Hospital of Pittsburgh
Medical Technologists	University of Nebraska Medical School, Laboratory of Nutritional Biochemistry
Nutritionists	Abt Associates staff and others, mostly alumnae of the Frances Stern Nutrition Center in Boston
Other Positions	Abt Associates local to each site; and Abt Associates, Cambridge, MA

Subcontracts, consulting agreements, and short-term Abt Associates employee agreements were negotiated to acquire the professional services of many members of the team. In general, most health care professionals collected data for the Head Start Health Evaluation under subcontract with the medical institution that carried malpractice insurance on the professionals and therefore would provide coverage in the unlikely event that such an issue arose.

Prior to data collection, it was necessary to secure approvals for certain of the health professionals to collect data in states outside the area of their medical licensure. Such approvals were required for the team pediatrician, optometrist, and dentist. Other team members did not require approvals. The audiologists had national licensure; the laboratory technologists could function under the license of either the pediatrician or the pedodontist; and the speech pathologists were local and therefore had the appropriate licenses. Making arrangements for approvals was nonetheless complex. The by-laws of most boards of licensure were not written to accommodate the needs of a national health evaluation in which health professionals engaged in collecting data, rather than practicing medicine. However, with few exceptions, all medical boards of licensure eventually developed a procedure to approve the data collection by out-of-state medical professionals. These approvals ranged from permanent or temporary licensure to authorizations or waivers. In only two instances was it necessary to recruit staff currently licensed and practicing within the state.

Biomedical Team Training

In late March 1980, all members of the biomedical teams participated in three to four days of training. (Nutritionists were trained one additional day because of the complexity and detail involved in the collection and coding of dietary data.) In general, the training had three purposes: (1) to orient staff to the study site and the logistic procedures, (2) to develop familiarity with the data collection instruments and protocols, and (3) to practice the data collection procedures on sufficient numbers of three- to six-year old children and parents to become familiar with the routine and to achieve high interrater reliability. All staff received general orientation to the study, including a description of all data collection instruments. Following orientation, training and practice sessions in each specialty area were held with senior consultants or Abt Associates staff. Finally, all biomedical team members were trained in administrative and site operations procedures to be followed during the pretest.

Location of Examination Center

Another task prior to data collection was the selection of an appropriate facility to serve as an examination center in each of the four sites. The ideal facility would have at least six private rooms (one each for the pediatric evaluation, dental and audiology evaluation,* blood draw, developmental evaluation, speech evaluation, and optometric evaluation) and several semi-private rooms for the nutritionists and health history interviewers. Such ideal facilities were not easy to find. Examination sites included three unoccupied offices in a small office building, a church, and an armory. Two sites required separate examination centers. Greene and Humphreys Counties are nearly 200 miles apart; two separate examination centers were used. Two examination facilities, approximately 40 miles apart, also were used in the Maricopa County site.

Sample Random Assignment

The evaluation design called for randomly assigning the sample into four equivalent groups in each site, as shown in Table 1A-1. Recruitment information collected by the evaluation assistants on each child was sent to the central evaluation staff. This information was coded, and a unique identification number was assigned. The children were divided into strata based on their age (in three-month intervals) gender and ethnicity. To ensure the equivalence of the assigned treatment and comparison groups, children were randomly selected from the cells defined by the strata and assigned to Head Start and non-Head Start. This assured a balanced sample at the time of the initial data collection.

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*The dental and audiology evaluations were performed in a combined space for three reasons: (1) both evaluations required a sound-proof space (audiology so that the children could hear and dental so the children not be heard because the children tended to cry from fear, (2) both evaluations could be performed in the amount of time required by other single evaluations (approximately 15 minutes), and (3) the audiologist had time available to function as the dental evaluation recorder.

All children recruited by mid-March were randomly assigned to a treatment group (Head Start or non-Head Start) and to an examination group (to be examined at pretest and posttest or at posttest only). The results of the original random assignment are shown in Exhibit 2A-4.

Immediately after random assignment had taken place in late March and early April of 1980, families were informed of the results by local evaluation assistants. Although some parents were disappointed when their child was at not assigned to the Head Start group, most agreed to remain in the study.

Exhibit 2A-4

Number and Percentage of Children Randomly Assigned to Head Start and Non-Head Start Groups by the Original and Final Assignment[a]

Treatment Group		Greene & Humphreys Counties n = 180		St. Clair County n = 277		Maricopa County n = 130		Mingo County n = 170		All Sites n = 756	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Original Assignment	n	89	91	149	128	64	66	86	84	388	368
	%	49.5	50.5	53.8	46.2	49.2	50.8	50.6	49.4	51.3	48.7
Final Assignment	n	98	82	136	141	81	49	90	80	405	351
	%	54.4	45.6	49.1	50.9	62.3	37.7	52.9	47.1	53.6	46.4

[a] The differences between the original and final assignments are explained below in the Pretest Data Collection section.

Families also were notified about their assignment to examination group. During the pretest data collection, however, random assignment to the examination group had to be abandoned because of scheduling difficulties and no-shows for the evaluation. All families willing to come to the examination center were invited to participate in the pretest data collection. The need to abandon random assignment to examination group had the potential of biasing the results of the longitudinal evaluation. For example, if only children with health problems participated in the pretest, this group would not be comparable to children participating only in the posttest. An analysis of health characteristics of both groups of children showed that no bias was introduced, as discussed in Appendix 2C. Despite this adjustment in the examination group assignments, the objective of administering pretesting only half of the children was achieved. We could not determine at the time of the pretest, however, what proportion of the "no shows" would eventually leave the evaluation entirely.

Stage III Activities

Pretest Data Collection

In each of the four sites, pretest data were collected in a one-week period during April 1980. An average of 19 children were processed at the examination center each day. To help limit attrition, a large proportion of the families were provided with transportation to and from the center by local evaluation assistants, who had scheduled appointments with the families. Coordination of arrivals and departures of families from the examination center frequently was a complex task.

The pretest data collection was intensive and long for each of the study participants. Many families spent more than two hours at the examination center. Not surprisingly, many of the children became fatigued as they progressed through various health evaluations. The length of time required and the often less-than-ideal environment in which the assessments took place may have reduced some children's ability to cooperate.

Interviews were conducted with five or six staff members from the local Head Start program to obtain a better understanding of the operation of the program and the services offered to children and their families. Typically, these Head Start staff included the director, the parent participation coordinator, the nutritionist, the health coordinator, and the social services coordinator.

Sample Problems

After the pretest data collection, the difficulties of maintaining random assignment to the Head Start and non-Head Start group were exacerbated by the Head Start program's annual recruitment of children for entry in the fall. Although the evaluation staff had anticipated this and had tried to make arrangements with each of the Head Start programs to cooperate with the random assignment, problems occurred that affected assignments of both Head Start and non-Head Start children. In some cases children shifted from the non-Head Start to the Head Start group, for example when the Head Start recruiters inadvertently began recruiting children in the non-Head Start group. In other cases, parents knew (as part of the informed consent procedure to participate in the study) that, if they decided to drop out of the evaluation, they could apply to Head Start to have their child enrolled. However, in other cases, the Head Start group of children decreased because there were not sufficient spaces in the local Head Start center for evaluation children assigned to enter Head Start or because the child simply would not "go to school." This combination of events led to a change in group status for 14 percent of the children recruited prior to pretest. (Similar to assignment changes that occurred at pretest, we carefully checked whether these changes introduced only biases; none were found.) These children were retained because their assignment changed before the Head Start treatment began or in cases of children who would not "go to school" so soon after Head Start began that those children received no appreciable benefit from the program.

Exhibit 2A-5 shows the distribution of Head Start and non-Head Start children in each of the four sites who participated in the pretest--50

Exhibit 2A-5

Number and Percentage of Pretest Children in the Head Start and Non-Head Start Group by the Original and Final Assignment

Treatment Group		Greene & Humphreys Counties n = 95		St. Clair County n = 113		Maricopa County n = 95		Mingo County n = 73		All Sites n = 376	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Original Assignment	n	47	48	65	48	53	42	44	29	209	167
	%	49.5	50.5	57.5	42.5	55.8	44.2	60.3	39.7	55.6	44.4
Final Assignment	n	52	43	61	52	62	33	40	33	215	160
	%	54.7	45.3	54.0	46.0	65.3	34.7	54.8	45.2	57.2	42.8

percent of the total sample of children recruited. Although 56 percent of the pretested children were originally assigned to enter Head Start in the fall, ultimately (after assignment changes occurred), 57 percent of the children were in the Head Start group.

Follow-up on Health Problems

As a result of the pretest evaluation, numerous children were identified as having health problems. These problems were followed up in two ways. For all children, complete summaries of the results of the health assessments conducted during the pretest were forwarded for follow-up to the primary medical caregiver identified by the mother or guardian. The primary medical caregivers named varied from general practitioners and pediatricians to a local health clinic. Where no primary caregiver was named by the mother, arrangements were made with a physician or health clinic in the community (typically those serving Head Start children) to accept the referral for follow-up. This procedure for followup on health problems was chosen for several reasons. First, the evaluation team was permitted only to conduct health examinations for purpose of the study, but were not licensed (in almost all cases) to practice medicine in the Head Start site. Second, it was deemed important to give the child's (or family's) "own doctor" an opportunity to interpret the results of the pretest examination and to ensure continuity of health care provision for the child. It should be noted, however, that few families asked their doctor about pretest examination results.

Children diagnosed by the evaluation's biomedical team as having health problems that required immediate medical attention were referred for follow-up care. (See Chapter Three for a discussion of the various types of health problems that needed immediate treatment.) A mechanism was set up to pay for needed medical services for children who did not have medical and dental insurance. Each of the four Head Start programs received a grant from the Administration for Children, Youth and Families to pay for medical services for these children. This aid was intended primarmily to pay for services to non-Head Start children. Some funds were used, however, to provide services to the Head Start group before they entered the program and became eligible for Head Start services. Local evaluation assistants were responsible for making the arrangements for follow-up medical care and for providing families with transportation as needed. It was the responsibility of local family physicians, however, to make an appropriate referral on behalf of the family or child.

As discussed in Chapters Three and Four, some of the children that were referred at pretest for urgent medical and dental problems were not included in some analyses because the treatment received had the potential of biasing study results.

Stage IV Activities

Sample Recruitment

The shortfall in the number of children recruited prior to pretest meant that a second wave of recruitment was required to bolster Head Start and non-Head Start sample sizes in each site. The second recruitment was begun immediately after the pretest data collection, but its intensity increased during the fall of 1980 and winter of 1981.

To augment the non-Head Start group of children, the evaluation assistants continued to door-to-door recruitment for additional Head Start-eligible children. In addition, they occasionally made contact with non-Head Start families who were recruited prior to pretest to ensure their continued willingness to participate in the evaluation. The recruitment of children to augment the Head Start group was conducted differently. Each program was asked for a list of all children who enrolled in fall 1980. From this list, all children currently participating in the evaluation were removed. No other selection criteria were applied to the list. Subsequently, a random sample of Head Start children was drawn. The number of children drawn from each program varied and was based on the estimated number required (taking projected attrition into account) to ensure there would be at least 100 Head Start children in the posttest at each site. The families drawn were subsequently contacted by the evaluation assistant and asked to participate in the posttest data collection.

Preparation for the Posttest Data Collection

Procurement of equipment, licensing of team members, and location of evaluation centers was similar to pretest logistics; the only difference was one of scale. Because the posttest was to be conducted on twice as many children as the pretest thus requiring two weeks of data collection per site, and data collection would occur at two sites simultaneously, allowances had to be made for sufficient supplies and equipment, staff, and time to examine over 200 children in each site. The size of the data collection team was expanded to include an additional speech pathologist, developmental evaluator, medical history interviewer, assistant in the laboratory, and two nutritionists. In some instances, because of busy professional schedules, team members could work only for one week of data collection so that arrangements had to be made for a substitution at the end of the first week. The amount of equipment required, as shown in Exhibit 2A-2, doubled. In two of the sites, larger examination centers had to be located (which accommodated more people more comfortably).

Posttest Data Collection

As noted earlier, the posttest data collection was scheduled for a two-week period in each of the four sites. Furthermore, data were collected in two sites simultaneously in April and May of 1981, rather than sequentially, as had been done in the pretest. An average of 20 children were evaluated each day of data collection. Transportation was again provided to almost of the families because it was one of the only ways to ensure that they would come to the evaluation site at the appointed time.

The length of time required to complete all of the child's health evaluations and the parent interviews varied, depending to a large extent on the child's willingness to separate from his/her mother. Because many of the children were older and better able to cope with this unusual environment (e.g., a health clinic in a church or armory) than at pretest, it was possible to complete the evaluations on some of the families in approximately two hours. Exhibit A2-6 shows the distribution of the Head Start and non-Head Start children who participated in the posttest.

Exhibit 2A-6

Number and Percentage of Posttest Children in the Head Start and non-Head Start Group by Original and Final Assignment

Treatment Group		Greene & Humphreys Counties n=228		St. Clair County n=194		Maricopa County n=167		Mingo County n=228		All Sites n=817	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Original Assignment	n	122	106	112	82	97	70	123	105	454	363
	%	53.5	46.5	57.7	42.3	58.1	41.9	53.9	46.1	55.6	44.4
Final Assignment	n	127	101	108	86	106	61	119	109	460	357
	%	55.7	44.3	55.7	44.3	63.5	36.5	52.2	47.8	56.3	43.7

Interviews were conducted with the Head Start staff. For the first time, a meeting was held with members of the health community in each of the sites. These discussions were particularly useful in formally introducing the data collection team to their counterparts in the community, facilitating the referral process for the children in need of services, and learning more about how health services are typically delivered to children of low-income families.

Follow-Up on Health Problems

After the completion of the posttest health evaluations, health status records and follow-up requirements for urgent health problems were managed similarly to pretest procedures. For all children summaries of the results were sent to the primary medical caregiver identified by the mother. For children in urgent need of medical attention, assistance in obtaining that service was provided. Head Start assumed the responsibility for follow-up of children enrolled in the program; evaluation assistants facilitated the follow-up for the non-Head Start children. (The children and the health problems which received this attention after posttest data collection are identified in an Appendix to Chapter Three.)

TECHNICAL APPENDIX 2B
STATISTICS AND METHODOLOGY

Because of the varied types of data and the diverse forms that the general research questions take when particularized to the domains of the Head Start Health Evaluation, the analyses have drawn upon a variety of statistical techniques, as summarized in Exhibit 2B-1. This appendix reviews the major techniques employed and comments on technical features of the analysis that required special treatment. Specifically, it begins by discussing preliminary examination of the data, analyses of "continuous" response variables, and more specialized analysis and modeling of categorical response variables. Then, because the data on children's dental health and treatment pose nonstandard analytical problems, a separate section explains the techniques adopted to deal with these data. Finally, comparisons between anthropometric measurements of individual children and available reference data become more reliable after first applying a smoothing technique to the reference data. A description of this approach concludes this appendix.

Preliminary Examination of Data

Even after removing clearly invalid data values (those identified during data collection, data entry, or data cleaning), one must still face the possibility of anomalous observations that, although possible in theory, are unlikely in practice (or at best, represent unusual outcomes that are not consistent with the behavior of the bulk of the data). To identify any such observations, especially in the nutrition, hematology, and dental data, we used basic techniques of exploratory data analysis (Tukey, 1977; Velleman and Hoaglin, 1981) to examine the unbounded continuous and discrete numerical variables. Stem-and-leaf displays, schematic plots, and related graphical procedures revealed a modest number of distinctly outlying observations on some variables.

Two variables from the hematology data illustrate the basic approach. Exhibit 2B-2 shows a schematic plot of the free erythrocyte protoporphyrin (FEP) values for the Head Start and non-Head Start children of Sample A, Sample B, and Sample C in St. Clair County, Illinois. In the Sample C Head Start group, one value stands out clearly as higher than the rest. A scat-

Exhibit 2B-1

Summary of Major Statistical Techniques by Domain of Analysis

Domain of Analysis	Statistical Technique
Attrition	Contingency tables and analysis of variance
Pediatric	Contingency tables
Dental	Contingency tables and Poisson models
Anthropometry	Contingency tables, smoothing, regression, and analysis of covariance
Diet/Nutrition	Contingency tables, regression, and analysis of covariance
Hematology	Contingency tables, regression, and analysis of covariance
Developmental	Contingency tables, regression, and analysis of covariance
Speech	Contingency tables, regression, and analysis of covariance
Vision	Contingency tables, regression analysis, and discrete multivariate analysis
Hearing	Contingency tables and regression, and analysis of covariance

terplot of hematocrit against age for a group of 37 Hispanic Head Start children (in Maricopa County, Arizona), Exhibit 2B-3, shows one child whose hematocrit is noticeably low when viewed against the relationship between hematocrit and age. This value thus deserves further analytic attention.

A rule of thumb from exploratory data analysis provided an objective basis for designating data values as possibly outlying, so that they could receive further attention. This rule works with the ordered observations in a sample, as follows. After obtaining the lower fourth F_L and the upper

Schematic Plot of Free Erythrocyte Protoporphyrin for Head Start and non-Head Start Children in Three Samples

2B-3

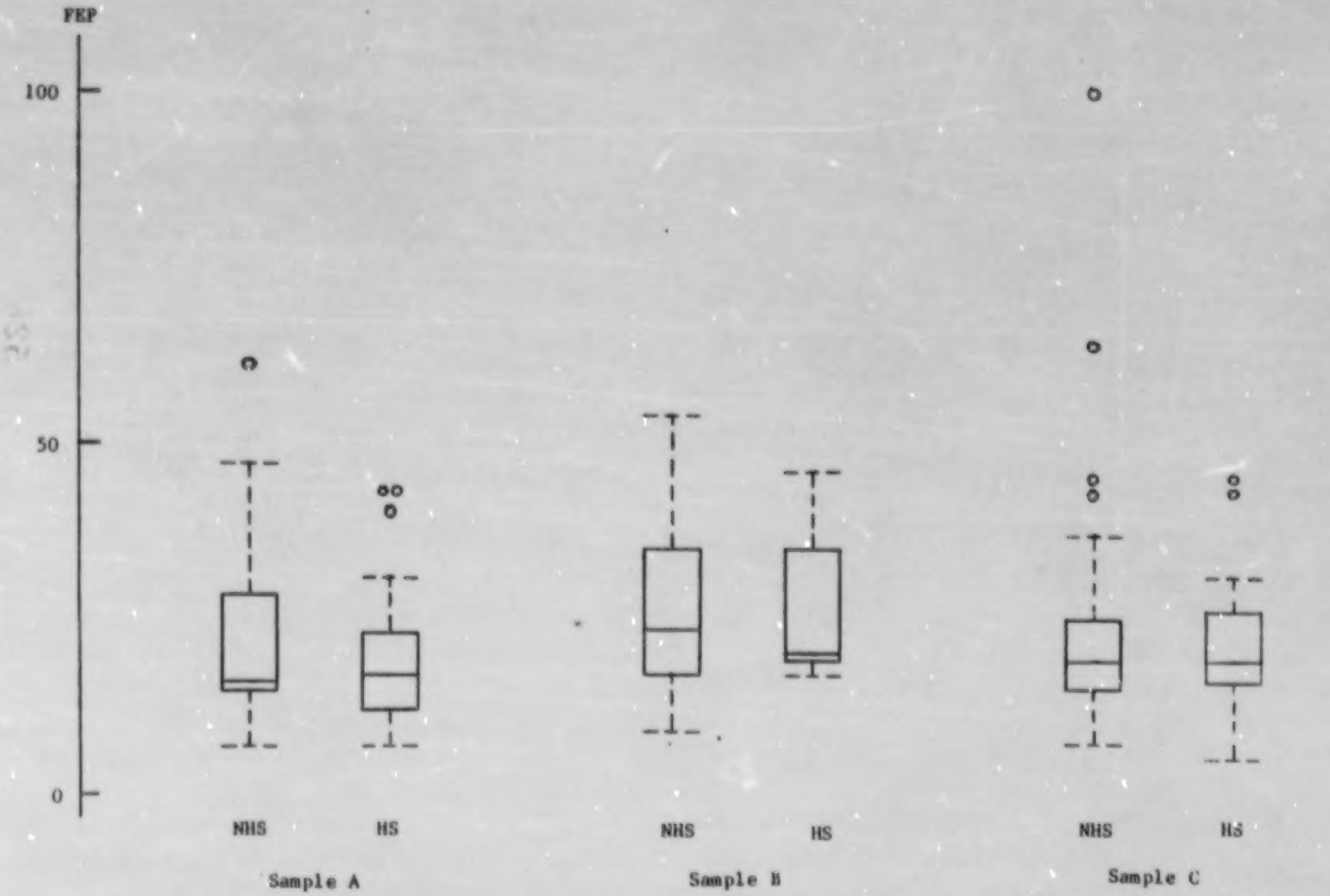
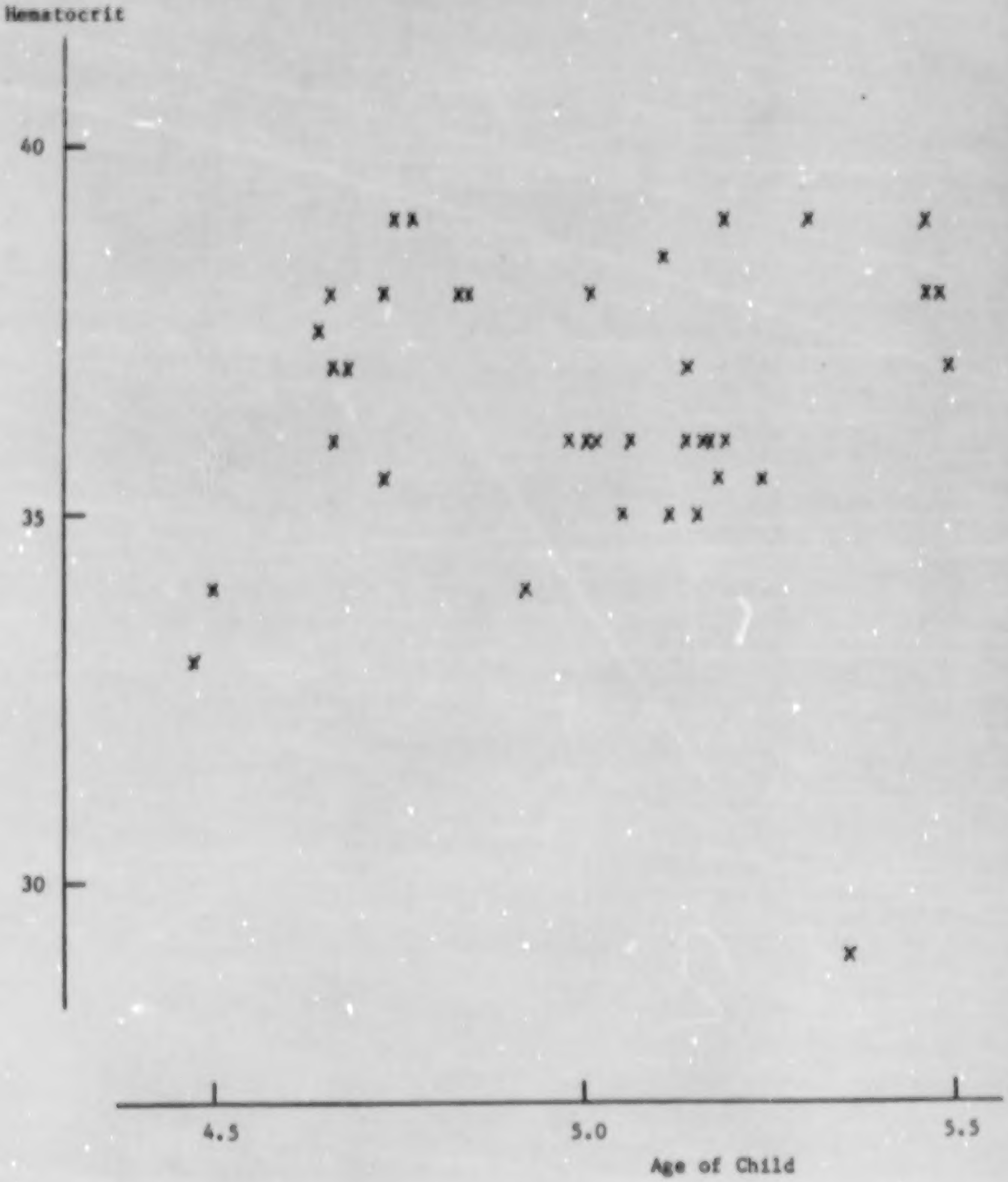


Exhibit 2B-3

Scatterplot of Hematocrit Against Age for
a Group of 37 Hispanic Head Start Children



fourth F_U (essentially the lower quartile and the upper quartile, respectively) from the ordered sample, we define the fourth-spread d_F according to

$$d_F = F_U - F_L$$

and then calculate the "outside cutoffs" (lower and upper)

$$F_L - 1.5d_F$$

$$F_U + 1.5d_F$$

Any observations outside these limits deserve close scrutiny as possible outliers. Hoaglin (1983) discusses this rule in somewhat greater detail, and Hoaglin, Iglewicz, and Tukey (1981) have studied its behavior in small samples. Briefly, it is helpful to note that in a normal population (because the normal distribution often serves as a model for well-behaved data) the combined fraction of the distribution that lies below $F_L - 1.5d_F$ or above $F_U + 1.5d_F$ is 0.00698. Naturally, sampling variation in F_L and F_U and in the more extreme observations in a sample leads to higher rates of "outside values" in small samples. For example, the average fraction of outside values in samples of 5 from a normal distribution is about 0.08, but in samples of 10 it is roughly 0.02. The practical message of these results is that outside values are relatively rare in well-behaved data, so that it is appropriate to detect them and investigate them further.

After a more detailed examination of the characteristics and other measurements of children who had outside values on variables in the hematology or nutrition domains, we set aside a relatively small number of observations that remained anomalous.* Specifically, we recoded them by changing the anomalous data value from a positive number to a negative number (we did not change any other variables that were not outlying for the child). Because the legitimate values of these variables are nonnegative, this procedure enabled us to treat the anomalous observations as missing while preserving them in the data base for examination in subsequent analyses (if desired).

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*These values are presented in the appendices to the hematology and nutrition chapters. Their exclusion from the analyses had no significant impact on the Head Start/non-Head Start comparisons.

The preliminary examination of data can also reveal systematic patterns of skewness in a variable that suggest the desirability of transforming it to another scale prior to analysis. A common step in careful analysis, this use of transformations aims at producing variables that are simpler to summarize and that more nearly satisfy the assumptions underlying most statistical procedures. For example, applying the logarithmic transformation to a variable whose data are substantially skewed to the right often yields a nearly symmetrical sample. At the same time, such a transformation often tends to promote homogeneity of variability, a characteristic usually assumed of univariate samples and, particularly, of the response variable in an analysis of variance or covariance. As it turned out, only a very few variables required transformation: We found it preferable to work with the logarithm of vitamin A intake, vitamin B_{12} intake, vitamin A intake as a percent of the child's RDA, and vitamin B_{12} as a percent of RDA in the nutrition data and with the logarithm of serum iron in the hematology data.

Analyses of "Continuous" Response Variables

The evaluation design involved random assignment of children in each of the four sites to a Head Start group and a non-Head Start comparison group. Further, within each of these groups, half of the children were randomly assigned to pretest data collection (with subsequent posttest data collection a year later), and the rest were assigned to the posttest (only) data collection.

In this designed structure the appropriate techniques for determining the effects of participation in Head Start, exposure to the pretest data collection, and site are those associated with the analysis of variance. One customarily assumes that the process of randomization has produced a reasonable degree of comparability among the groups on all relevant characteristics, so that the effects and sum of squares associated with the factor Head Start form the basis for judging whether the Head Start program had a significant impact on the response variable in question. Of course, the pattern of sample sizes in the groups constitutes an unbalanced design and requires attention to the order in which the factors enter the analysis-of-variance decomposition.

Even in such a randomized experiment, however, it is often advantageous to consider adjusting the response variable for possible contributions from plausible covariates, because the randomization process delivers comparability on the average but not necessarily in each individual realization. In the present analyses, one must also allow for the possibility that attrition between pretest and posttest (as discussed in Chapter Two) has weakened the comparability among the groups, and hence inclusion of covariates becomes even more attractive. The following discussion presents the major factors and basic models that guided the analyses.

Analytic Framework

As a basis for discussion of the effects that can be estimated from the data (posttest as well as pretest), we use a simple statistical model in which Y represents the continuous response variable. For both the Head Start group and the non-Head Start group, the typical value of Y in the pretest data is given by

$$Y_1 = G$$

where G represents the general level of the response (for example, an overall mean). We do not include the error or fluctuation term often shown in such statistical models, and we also omit subscripts for the factors that we actually take into account.

In the posttest data three main influences may contribute to the typical value of Y: the passage of time (a proxy for development in the absence of any interventions or treatments), the screening and diagnosis involved in the pretest data collection, and participation in the Head Start program. We symbolize these effects by Time, Pre, and HS, respectively; and we use a subscripted "one" (for example, 1_{HS}) as an indicator variable, whose value is 1 for children in the corresponding group and 0 for all others. Thus, the posttest model takes the form

$$Y_2 = G + (\mathrm{Time}) + (\mathrm{Pre})1_{\mathrm{Pre}} + (\mathrm{HS})1_{\mathrm{HS}}$$

For the Head Start and non-Head Start children in Samples A and B, this model yields the following typical values:

Non-Head Start, posttest only

$Y_2 = G + (Time)$

Non-Head Start, pretest and posttest

$Y_2 = G + (Time) + (Pre)$

$Y_1 = G$

Head Start, posttest only

$Y_2 = G + (Time) + (HS)$

Head Start, pretest and posttest

$Y_2 = G + (Time) + (Pre) + (HS)$

$Y_1 = G$

By forming the proper differences among these typical values, we can see how to arrive at estimates of the effects.

For the effect of time, we could look at the difference between Y_2 in the non-Head Start, posttest-only group and Y_1 in the non-Head Start, pretest-and-posttest group. Because this effect is not especially important, we do not discuss it in the reported analyses.

For the effect of pretest screening and diagnosis, we could look at the difference between Y_2 in the non-Head Start, pretest-and-posttest group and Y_2 in the non-Head Start, posttest-only group. Alternatively, we can use the corresponding difference between the Head Start groups. These two estimates of the pretest effect need not be the same, and the difference between them is an estimate of the interaction effect for the combination of the pretest examination and participation in the Head Start program. It would be reasonable to consider such an interaction, because the pretest screening and diagnosis may identify some health problems that the Head Start program would have found and corrected anyway. Neither the pretest effect nor this interaction assumes any special importance, however, and the reported analyses do not estimate or discuss them.

For the effect of participation in the Head Start program, which is often the focus of our analyses, we look at the difference between Y_2 in the Head Start, posttest-only group and Y_2 in the non-Head Start, posttest-only group. Alternatively, we could use the corresponding difference between the two pretest-and-posttest groups. These two estimates of the Head Start effect need not be the same, and the difference between them is simply the interaction effect mentioned above. In reality, it turned out that such interactions could be neglected.

The comparison of the Head Start and non-Head Start children in Sample C (the augmentation recruitment) also contributes to the estimate of the Head Start effect (only posttest data were collected on these two groups of children). We combined these two groups with Samples A and B (the pretest-and-posttest groups and the posttest-only groups, respectively) in order to obtain a more stable cross-sectional estimate of the Head Start effect.

As a way of focusing on the comparisons that are appropriate and on the effects that the design and the data allow us to estimate, this discussion has not mentioned the possibility of bringing covariates into the model. We touch on this below in an example.

Although the analyses generally focus on the four sites individually and separately, we recognize the need to make overall statements about the evaluation as a whole. Thus, in developing answers to some of the evaluation questions, we have attempted to aggregate data across sites whenever this step was justifiable in terms of the assumptions underlying the statistical procedures involved. For example, an initial description of the prevalence of chronic problems assesses the comparability between our samples and the more general Head Start-eligible population. Even when data can be aggregated across sites, the site-specific effects give an indication of the variation that one can expect to encounter among Head Start programs. Also, some questions specifically address the relationships between effects and the methods of service delivery (which may vary across sites).

Cross-Sectional Analyses

The analyses have worked with the pretest data and the posttest data in several ways. The primary distinctions are among cross-sectional analyses and longitudinal analyses, crossed with descriptive and relational analyses within and among domains of data. In general terms, the cross-sectional analyses of the posttest data parallel the analyses conducted earlier on the pretest data. Usually they summarize a variable in terms of such traditional measures as means, standard deviations, medians, interquartile ranges, and correlations. The cross-sectional relational analyses of the posttest data involve primarily comparisons among groups and relations among variables across domains.

Longitudinal Analyses

To answer questions that involve the impact of Head Start, as measured in terms of change from pretest to posttest, our analyses generally treat the posttest value of the relevant variable as the response and the corresponding pretest value as a covariate. (Other covariates are also appropriate in specific analyses.)

In addition to the response variable and covariate mentioned above, the models incorporate an effect for Head Start as well as other factors as required (for example, sex and age group in some instances) and other covariates. Symbolically, these models take the form:

$$\begin{aligned} Y = &\ (\text{common}) + (\text{HS}) + (\text{effects for other factors}) + \\ &\ b^*(\text{pretest value}) + (\text{terms for other covariates}) \\ &\ + (\text{fluctuation}). \end{aligned}$$

For simplicity, this equation omits the subscripts that identify individual children within the groups defined by Head Start and the other factors. In some instances we have analyzed the data for the four sites separately because we encountered different patterns of effects (and interactions) from site to site. Also, when different sites yield different slopes (such as b in the above equation) for the covariate(s), trying to combine the data across sites would violate a key assumption of the analysis of covariance.

Example

To facilitate discussion of major analyses and the technical issues that arise, we consider a specific example, taken from the nutrition evaluation. To determine the impact of the Head Start program on children's total

24-hour caloric intake, we use cross-sectional posttest data on this dietary variable. Here the factor Head Start has three levels: Head Start children who were in school on the day when the meal observations were taken, Head Start children who were absent on that day, and non-Head Start children. In addition to Head Start, the factors include site (because we are able to combine the data from the four sites in this analysis) and subsidy (Food Stamps only, WIC only, Food Stamps and WIC, or none). The appropriate covariates are the posttest age of the child, the gender of the child, and whether any member of the child's household was employed (one indicator of the family's socio-economic status).

In bringing the variables into the model one may begin with the covariates, take site and subsidy next, and finally include Head Start. (The order of entry does not affect the estimates of the effects for the factors or the coefficients for the covariates, but it does matter in assessing the contribution of a factor or covariate in terms of its sum of squares and mean square.) Alternatively, one may bring in the covariates and the factors simultaneously. We have generally followed this second strategy, and hence the F-statistics treat the particular factor or covariate as the last one to enter the model. This is essential for Head Start because we want to attribute to the program only variation that cannot be accounted for by the covariates or by differences among sites (or on other factors). The unbalanced statistical design employed requires that, in order to gain proper control over the order of entry of the factors and covariates, we must express the analysis-of-covariance model as a multiple-regression model and then specify the order in which the variables enter.

Exhibit 2B-4 shows an analysis-of-variance table for this model, and Exhibit 2B-5 gives the estimates of the effects and the coefficients. Except for the subsidy factor (to which we return shortly), all factors and covariates are highly significant statistically. This outcome, however, must be tempered by the realization that, in terms of R^2, the model accounts for only 18 percent of the variation in 24-hour caloric intake; a great deal of child-to-child variation remains unexplained by this model.

In the effects for the Head Start factor we notice that Head Start children who were absent that day had lower caloric intakes than did non-Head Start children. (Because a variety of interpretations may be appropriate for this pattern of effects, we leave discussion of them to the nutrition evaluation, Chapter Six.)

Exhibit 2B-4

Analysis-of-Variance Table for 24-hour Caloric Intake

Source	Sum of Squares	DF	MS	F
Head Start	6132403	2	3066201	14.184
Site	16448532	3	5482844	25.363
Subsidy	260072	3	86691	0.401
Age of child	2570268	1	2570268	11.890
Gender of child	2996996	1	2996996	13.864
Household Member employed	1163026	1	1163026	5.380
Model	33080640	11	3007330	13.912
Residual	150239648	695	216172	
Total	183320288	706		

$R^2 = 0.180$

Exhibit 2B-5

Estimated Values of Coefficients in Analysis-of-Covariance Model for 24-hour Caloric Intake

Coefficient	Value
Head Start	
Present in program	136.7
Absent from program	-100.3
Non-Head Start	-36.4
Site	
Greene and Humphreys	-87.6
St. Clair	273.6
Maricopa	-220.3
Mingo	34.2
Subsidy	
Food Stamps	-19.5
WIC	9.9
Food Stamps and WIC	-20.2
None	29.8
Posttest age of child	96.4
Target child male	130.7
Household member employed	-93.1
Constant	1185.6

Among the site effects, children in St. Clair County had higher caloric intakes, children in Maricopa County had lower caloric intakes, and those in the other sites fell in between. Here, as for all the other effects and coefficients, the interpretation must take into consideration the fact that the model has incorporated allowances for simultaneous linear change in all the other variables. Thus, the site differences reflect those adjustments.

The effects for the subsidy factor are chance fluctuations and do not lead to any interpretation. If 24-hour caloric intake were the only dietary variable being analyzed, we would customarily remove this factor from the model. However, because other dietary variables show significant effects for the subsidy factor, we have adopted the procedure of leaving it in the model. Thus, we gain the simplicity of applying the same model to all the dietary variables and being able to think about the effects and interpretations of all the variables in this single framework, rather than having to contend with somewhat different models for the different response variables.

The coefficients for the three covariates are the values that arose in adjusting for the contributions of these variables: 96.4 (calories per year of age) for "Posttest age of child," 130.7 calories for "Target child male," and -93.1 for "Household member employed." We interpret these coefficients with the same caution needed to interpret the coefficients in any multiple-regression model (see, for example, Mosteller and Tukey, 1977 Chapter 13). The first two coefficients seem plausible when we consider what relationship we would expect to observe between caloric intake and age and between caloric intake and sex of the child in the absence of other explanatory variables. The coefficient for "Household member employed" seems to have the opposite sign from what one would expect. However, when we examine the simple correlation between caloric intake and employment (and income) the sign remains the same. That is, the two variables are negatively correlated, though the magnitude of this correlation is not high. Thus, this instance does not accord with intuition, and the results would lead us to examine more closely what this relationship might signify. (We must keep in mind that this coefficient tells how caloric intake changes in response to employment status, after allowing for simultaneous [linear] change in all the other explanatory variables in the model.) One could speculate that this relationship is similar to the "Medicaid effect" (Kowar, 1982) where children just above the Medicaid eligibility level receive the least amount of health care. In this instance, it is plausible that children whose parent(s) are employed and therefore are not eligible for Food Stamps or WIC have the lowest caloric intakes. In any event, our interest primarily centers on Head Start effects and site effects, so that discussions of the fitted models in the body of the report only occasionally need to devote attention to the values of coefficients associated with the covariates.

Coding Schemes for Sets of Indicator Variables

A number of important technical details arise in choosing an appropriate coding of the Head Start factor (and other factors, such as site and subsidy in Exhibit 2B-5) in some models. In the data base for the evaluation, the variable that records the Head Start/non-Head Start status of each child is simply coded as 0 for non-Head Start and 1 for Head Start. The usual analysis-of-covariance models treat this variable as categorical, defining the levels of the factor Head Start, so that the actual numerical values do not matter. For some models, however, in which the analysis must distinguish only between the Head Start group and the non-Head Start group (and not additionally, as in Exhibit 2B-5, between Head Start children who were present and those who were absent) but must also be formulated as a multiple-regression model in order to incorporate a particular interaction structure, the Head Start indicator enters the model directly with an associated coefficient. In these instances the fitted coefficient measures the size of the Head Start effect (that is, the difference between Head Start and non-Head Start, after allowing for the contributions of the other variables), and the constant term in the model summarizes the level of the response variable in the non-Head Start group. We could have handled this technical detail by allowing the constant term to summarize the overall level for all children and using an explanatory variable coded +1 for Head Start and -1 for non-Head Start, so that the difference between the Head Start group and the non-Head Start group would be twice the value of the effect for the Head Start group, but it was more straightforward to retain the 0-1 coding, with its easier interpretation.

For categorical variables that have more than two levels (such as site--and Head Start when we must distinguish between children who were present and those who were absent, as in Exhibit 2B-5), the details of coding involve more choices. We had to face these because of the need to work with analysis-of-covariance models in multiple regression form. For site, it was appropriate to use what is known as effects coding (Cohen and Cohen, 1975, Section 5.4). This scheme explicitly implements the customary constraint that the effects for a factor sum to zero (as we see numerically for site in Exhibit 2B-5). Ordinarily, we handle this by defining the effect for the last level of the factor to be the negative of the sum of the effects for the other levels. This means that, in setting up the explanatory variables for the multiple regression model, we create one explanatory variable for each level except the last. In this coding scheme, each such explanatory variable takes the value 1 for the level to which it corresponds and the value -1 for the last level. Thus, for example, the three explanatory variables for site are as follows. The one for Greene and Humphreys Counties has a 1 for each child in that site and a -1 for each child in Mingo County. The variable for St. Clair County has a 1 for each child in that site and a -1 for each child in Mingo County. Finally, the explanatory variable for Maricopa County has a 1 for each child there and a -1 for each child in Mingo County. The choice of which factor to code as the "last" can be made arbitrarily. From the regression output one can easily calculate the effect for the "last" level of a factor coded in this fashion. The standard error for this last effect, however, cannot be calculated from those for the other effects unless the regression program provides the full covariance matrix or correlation matrix for the estimated coefficient. Because we used SPSS, which gives the user no way to obtain this important information, our tables generally show no standard error for the last level of an effects-coded factor. (In some instances we have obtained these standard errors by rerunning the regression with another level of the factor as the "last" level in the coding.)

A similar technical problem affects factors for which we wish to test the significance of a difference between two levels, as in Head Start-present versus Head Start-absent. To make such tests, we rewrite the multiple regression model so that the difference of interest becomes the coefficient of one of the explanatory variables (and thus is accompanied by the requisite standard error in the regression output). Technically, such differences between effects are a special case of the more general statistical notion of contrasts, and the appropriate approach is to use contrast coding (Cohen and Cohen, 1975, Section 5.5). By definition, a contrast is a linear combination of effects in which the coefficients of the linear combination sum to zero; for example, $L = a_1e_1 + \ldots + a_ke_k$, where $e_1, \ldots, e_k$ are the effects and the coefficients $a_1, \ldots, a_k$ satisfy $a_1 + \ldots + a_k = 0$. The simplest case, with which we are most concerned, sets one of the a_i equal to +1, another to -1, and the rest equal to 0. For technical reasons, contrast coding requires that the explanatory variables for the factor comprise a set of orthogonal contrasts; the number of these equals the number of degrees of freedom associated with the factor. Two contrasts are orthogonal when their coefficients, say $a_1, \ldots, a_k$ and $b_1, \ldots, b_k$ satisfy $a_1b_1 + \ldots + a_kb_k = 0$. Thus, to obtain the desired comparison between Head Start-present and Head Start-absent, we constructed the contrast-coded variable that has +1 for Head Start-present and -1 for Head Start-absent (and 0 for non-Head Start). Because the set of possible contrasts for a three-level factor is two-dimensional, choosing one contrast essentially determines the remaining one. In this instance, the second contrast has +1 for Head Start-present, +1 for Head Start-absent, and -2 for non-Head Start.

Analysis and Modeling of Categorical Response Variables

The numerous categorical outcome or response variables required a variety of choices in analysis and modeling. These included the treatment of two-by-two tables, the assessment of goodness of fit, the overall approach for higher-way tables, the sampling models underlying the data, log-linear models for higher-way contingency tables, the treatment of structural zeros, and the examination of residuals. We briefly discuss these issues in the subsections that follow.

Two-by-Two Tables

Many of the research questions lead to an analysis based on a two-by-two contingency table. Examples include (1) the presence or absence of a particular deficiency in the vision, speech, or hearing domain by Head Start and non-Head Start and (2) receipt of a certain health service by Head Start and non-Head Start. The analysis compares the proportion in the Head Start group with that in the non-Head Start group and looks for a significant departure from equality. We judge the extent and significance of such departures by using a chi-squared test (discussed further below under "Goodness of Fit").

Goodness of Fit

To assess the adequacy of a model or models that we hypothesize for a contingency table, we use the ordinary (Pearson) chi-squared statistic,

$$X^2 = \sum_{\text{all cells}} \frac{(\text{observed}-\text{expected})^2}{\text{expected}}$$

which approximately follows the chi-squared distribution when the total number of observations in the table, N, is large. One rule of thumb for "large enough" is that N should be at least ten times the number of cells in the table. A related issue that affects the adequacy of using the theoretical chi-squared distribution to approximate the distribution of X^2 is the possible presence of small expected counts in some of the cells in the table. One classical rule (far too conservative) requires that all expected counts be at least 5. A more reasonable rule, supported by considerable research, requires only that all expected counts be at least 1.0. We followed this latter rule.

Testing goodness of fit in a two-by-two table offers some further choices. A common recommendation is to use the corrected chi-squared statistic, obtained by taking the absolute value of (observed-expected) in each cell and reducing it by 1/2 before squaring and proceeding with the rest of the calculations in the above formula for X^2. (This recommendation applies only to two-by-two tables; that is, to situations with only 1 degree of freedom.) The correction aims at making the significance level right in the sampling situation where both the row margin and the column margin of the table are fixed. Fienberg (1980) points out that using the corrected chi-squared test results in an overly conservative test; that is, the test rejects substantially less often than the intended significance level would indicate. For two-by-two tables, we used the uncorrected chi-squared statistic.

When the total sample size, N, is quite small, no large-sample approximation can be expected to do very well, and neither X^2 nor its corrected version is adequately accurate. In this situation, one generally uses Fisher's exact test. The values of N for two-by-two tables in most of our analyses were large enough that we did not have to employ this procedure.

Higher-Way Contingency Tables

To investigate the relationship between a categorical (or dichotomous) response variable and two or more categorical explanatory variables, we have generally followed the approach of fitting log-linear models to the observed contingency table. Without going into the technical details, which are available in such books as Bishop, Fienberg, and Holland (1975) and Fienberg (1980), we mention that this approach works with the probabilities associated with the cells defined by the combinations of values on the explanatory variables and the response variable. By transforming to a logarithmic scale (for the purpose of the theory), it is possible to develop models that are entirely parallel to the usual analysis-of-variance models for continuous data and that lead easily to interpretation and understanding of the structure of the observed contingency table. For further exposition we use a concrete example from the dental domain.

A Dental Example. At posttest we asked whether the child had ever been to a dentist. To see whether this response variable is related to Head Start participation and the wave of recruitment, we form the crosstab of these three variables within each of the four sites. Exhibit 2B-6 shows the numbers of children in each of the eight cells in each site.

We can get a rough idea of how this variable behaves by calculating the percentage of children who have ever visited a dentist, within each of the four cells corresponding to the two factors: Head Start/non-Head Start and Wave 1/Wave 2. Exhibit 2B-7 shows these percentages by site. Greene and Humphreys Counties seem to have some effects for both Head Start and wave. St. Clair County has a big Head Start effect but probably no wave effect. Maricopa County probably has both effects, and so does Mingo County. In some sites the deeper question is whether we have an interaction between Head Start and wave.

We pursue such questions in more detail and attach significance levels to them via fitting various log-linear models to see how simple a model may be adequate. The primary concerns are whether we need the Head

Exhibit 2B-6

Cross-tabulation of Children in Each Site According to Wave of Recruitment[a], Head Start/ Non-Head Start, and Whether Parent Reported at Posttest that Child Had Ever Visited a Dentist

Site	Wave	Head Start Group	Ever been to dentist?	
			No	Yes
Greene & Humphreys Counties	1	HS	44	31
		NHS	35	17
	2	HS	32	17
		NHS	40	7
St. Clair County	1	HS	6	31
		NHS	25	20
	2	HS	11	60
		NHS	25	14
Maricopa County	1	HS	3	47
		NHS	4	12
	2	HS	6	50
		NHS	28	15
Mingo County	1	HS	6	29
		NHS	20	12
	2	HS	27	54
		NHS	65	12

[a] Wave = 1 for the recruitment prior to pretest; and Wave = 2 for the augmentation recruitment prior to posttest.

Exhibit 2B-7

Percentages of Children in Each Site
Who Have Ever Visited a Dentist, by Wave and Head Start/
non-Head Start

Site	Wave	Head Start	non-Head Start
Greene & Humphreys Counties	1	41.3	32.7
	2	34.7	14.9
St. Clair County	1	83.8	44.4
	2	84.5	35.9
Maricopa County	1	94.0	75.0
	2	89.3	34.9
Mingo County	1	82.9	37.5
	2	66.7	15.6

Start effect, the wave effect, or the interaction term. Before we fit the log-linear models, however, we must give some attention to how the data came about.

Sampling Models

In principle, we can fit some eight hierarchical models to a 3-variable contingency table (complete independence, three versions of partial independence, three versions of conditional independence, and no three-factor interaction). We would expect to consider all these models if all three variables were responses (for example, "Has child ever visited a dentist?" "Does child brush teeth daily?" "Does child eat sweet snacks?"); but when one or more of the variables are factors, we must give careful attention to the way in which we obtained the sample--this may tell us that some models make no sense.

Without going into technical detail, we point out that the only sensible models relating "Ever been to dentist" to Head Start and wave are those that exactly fit the two-way margin formed by the two factors, Head Start and wave. The reason is simple: The design essentially fixed the number of children in each of the four cells defined by the combination of Head Start and wave. Thus, we obtained a separate sample in each cell. In Wave 1 we deliberately randomized between Head Start and non-Head Start. We certainly did not take a big sample of children and then ask whether each was participating in Head Start or to which wave each belonged. Thus, our log-linear models must contain the two-factor interaction between wave and Head Start, so that they fit the corresponding margin of the data exactly. As a result, looking at the percentages in Exhibit 2B-7 brought us reasonably close to the right analysis.

The Log-Linear Models

In order to work through the log-linear models that still make sense for the dental example, we need a notation. We number the variables as follows:

1 Wave
2 Head Start
3 Has child ever been to dentist?

One compact notation lists the faces of the contingency table that the model must fit exactly, using a slash (/) to separate the variable numbers involved in specifying one face from those involved in specifying another. Thus "1 2 / 3" denotes the model that exactly fits the two-way margin for Variables 1 and 2 and the one-way margin for Variable 3.

Because all our models must exactly fit the margin for wave and Head Start, the ones that make sense are as follows:

1 2 / 3	Dentist independent of wave and Head Start
1 2 / 1 3	Dentist independent of Head Start, given wave
1 2 / 2 3	Dentist independent of wave, given Head Start
1 2 / 1 3 / 2 3	No three-factor interaction

Because the 1-2 interaction must be present, we can interpret these four models in a more nearly two-way fashion: neither wave nor Head Start effects, wave effect but not Head Start effect, Head Start effect but not wave effect, and both wave and Head Start effects, respectively.

Exhibit 2B-8 shows the results of fitting the four models to the data for each site. At this level we concentrate on the (Pearson) chi-squared statistic and its degrees of freedom. A large value of X^2 indicates that the model does not fit the data adequately. Thus, we would like to adopt the simplest model for which X^2 is not significant (say, at the usual .05 level). For chi-squared on 2 degrees of freedom, the critical value at the .05 level is 5.99. Thus, we find that Greene and Humphreys Counties and St. Clair County have a Head Start effect but no Wave effect,

Exhibit 2B-8

Pearson Chi-Squared Statistics for Each of the
Four Hierarchical Log-Linear Models in Each Site

Model	Degrees of Freedom	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County
1 2 / 3	3	9.44	40.55	52.84	62.21
1 2 / 1 3	2	5.99	40.38	36.54	56.83
1 2 / 2 3	2	4.81	0.64	8.32	9.47
1 2 / 1 3 / 2 3	1	1.37	0.33	1.26	0.18

whereas Maricopa County and Mingo County have both a Head Start effect and a wave effect. (Although the value of X^2 for the "1 2 / 1 3" model in Greene and Humphreys Counties coincides with the critical value to two decimal places, it falls just short of being significant. Thus, either "wave effect but no Head Start effect" or "Head Start effect but no wave effect" would be an adequate description of the data. The latter description, corresponding to the "1 2 / 2 3" model, provides a somewhat closer fit.) With this assessment of significance out of the way, we may return to Exhibit 2B-7 to see the direction and size of the effects.

Having analyzed the data separately for each site, we can note that models which treat site as a further factor would have to include the three-factor interaction for Head Start and wave and site, as a consequence of the design. In addition, they would probably (in order to fit adequately) need the effects for both Head Start and wave and would thus tend to obscure the fact that the picture is simpler in two sites.

Structural Zeros and Related Problems

Some contingency tables contain one or more cells in which it is impossible to observe any count other than zero. If, hypothetically, we cross-tabulated the pretest and posttest responses to the question "Has the child ever visited a dentist?" the combination of a "Yes" at pretest and a "No" at posttest is invalid. In the terminology of log-linear models, this is a structural zero, rather than an observed zero (where we could, in principle, have gotten some positive count).

It is straightforward for the fitting of log-linear models to accommodate the constraint of a structural zero, but we have generally tried to avoid such situations. Among other problems, each structural zero costs a degree of freedom in the chi-squared test. Because data involving dichotomous variables often have relatively few degrees of freedom, the consequence would be a smaller set of models that we would be able to consider.

Residuals

A chi-squared test statistic summarizes the overall goodness of fit of a model to the observed contingency table, but often one needs to examine the differences between the data and the model cell by cell, in order to determine whether an unsatisfactory fit reflects general inadequacy of the model or simply isolated unusual behavior in only a few cells. The simple differences (observed count minus fitted count) provide some help for this purpose, but they have the drawback of not being homogeneous in their variability.

A useful form of residuals for fits to counted data is the Freeman-Tukey deviates (see, for example, Bishop, Fienberg, and Holland 1975), one for each cell,

$$\sqrt{x} + \sqrt{x+1} - \sqrt{4m+1}$$

where x is the observed count in the cell and m is the fitted count calculated according to the model. When the model is correct, so that only chance variation separates the observed cell counts from the fitted cell counts, it is appropriate to think of the individual Freeman-Tukey deviates as observations from a standard normal distribution. (The average value and variance are correct to a close approximation, but the set of Freeman-Tukey deviates for a whole table departs from resembling a random sample because the individual deviates are not independent.)

Special Problems of Prevalence and Incidence Variables in the Dental Data

Among the dental variables, some seem especially unruly: many zero values, many small to moderate values, and a fair number of rather large values. Prime examples are the number of decayed and filled teeth per child and the number of decayed and filled surfaces per child (each tooth has five surfaces). Diligent and creative exploration suggested a more basic effort to develop a plausible model for the behavior underlying these data.

For such counted data (that is, data that take only whole-number values like 0, 1, 2, and so on) one frequent statistical model is the Poisson distribution. Most often applied to "rare" events, such as the number of decays by a quantity of radioactive substance in time intervals of fixed length, this model has also been applied to a wide variety of other processes in many fields. For a given value of the parameter, m, the Poisson distribution assigns probabilities according to the formula

$$p_m(k) = e^{-m}\frac{m^k}{k!}, \qquad k = 0, 1, 2, \ldots$$

(for typographical convenience, m replaces the more common Greek lambda). Ideally, to apply such a model to the prevalence of decay, we would need data on the number of cavities and fillings, but the actual data indicate only whether a surface has either a cavity or a filling, and not the number of each in the surface. Still, when we work with surfaces, rather than teeth, this limitation seems not to be serious.

To be reasonably realistic in applying a Poisson model to data on decayed and filled surfaces, we need to recognize that the parameter (thought of as an underlying average decay intensity) almost surely varies from child to child. Relevant factors in the variation among children are likely to include heredity, diet, oral hygiene, and fluoride intake. Thus, it is probably plausible to expect data that are Poisson, but not with a single underlying value of m. The theoretical approach to modeling this sort of situation is to treat the individual underlying values of m as if they come from some statistical distribution. The result is known as a compound Poisson model.

Before embracing a compound Poisson model so eagerly, however, we should try to learn whether it is at all reasonable for our data. The easy thing to do is to ask how closely the frequency distributions for the number of decayed and filled surfaces follow a simple Poisson distribution. For checking this, a graphical technique devised by Hoaglin (1980) works as follows. We denote the frequency of k in the sample by f_k (that is, the number of children who had k decayed and filled surfaces), and we plot

$\log_e(f_k) + \log_e(k!)$ against k.

In the ideal situation in which the data are perfectly Poisson with parameter m and the f_k exactly equal the values that we would expect in a sample of $n = f_1 + f_2 + \ldots$, namely $f_k = n \times p_m(k)$, the plot yields a straight line with slope $\log_e(m)$. If the data are compound Poisson, we might expect a plot that is not too far from having a small number of straight segments.

Exhibits 2B-9 through 2B-12 are the Poissonness plots for the number of decayed and filled surfaces in children who had 20 teeth in the four sites. The restriction to 20 teeth avoids some minor confusion from variation in the number of teeth; it is convenient at this exploratory stage but does not apply to the actual analyses. About 85 percent of the children in the overall sample had 20 teeth. Each of the samples has a number of large values of k; but, after a certain point, these contribute little to the plot and are not shown.

Although both the vertical and horizontal scales vary from plot to plot, a look at the four plots indicates that they are generally not far from straight for reasonably long stretches, when one makes a little allowance for the inherent variability in the data (the observed frequencies, f_k, do not exactly coincide with their expected values, even under the assumed simple Poisson model on which the plot is based). In all four plots one notices a concentration of values at zero, especially in St. Clair County, Maricopa County, and Mingo County (where the plot is based on only the data from children whose homes have well water, because only 40 children have municipal water at home--too few for a satisfactory plot). This concentration could easily reflect a component in the compound Poisson model that has a small value of m.

On the whole, a small number of components, say three or four, would provide an adequate fit to the data in these sites. It seems plausible, however, that the distribution of values of m among children is actually continuous, rather than concentrated at a few values.

Exhibit 2B-9

Poissonness Plot for Number of Decayed and Filled Surfaces Among Children in the Mississippi Site(s)

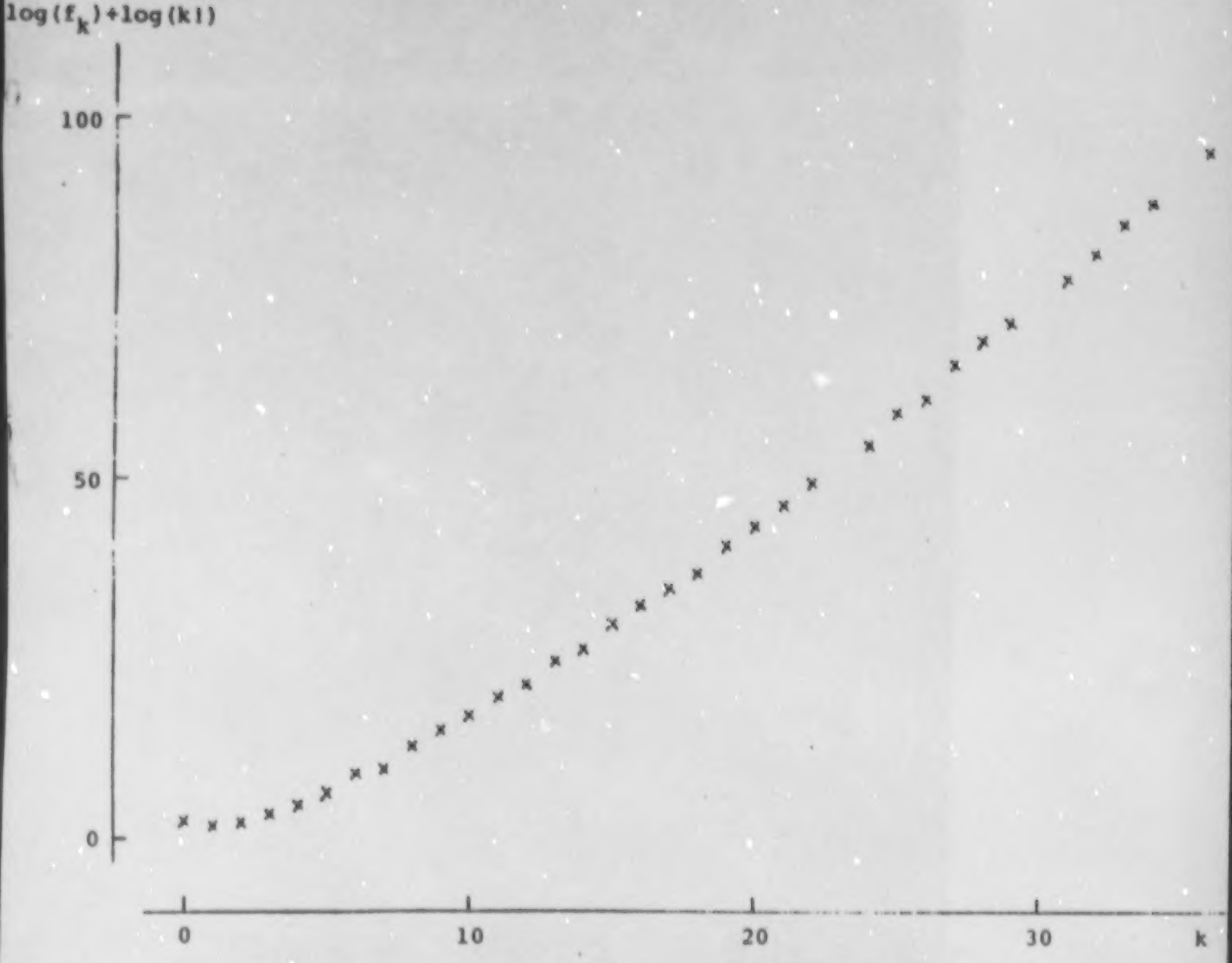
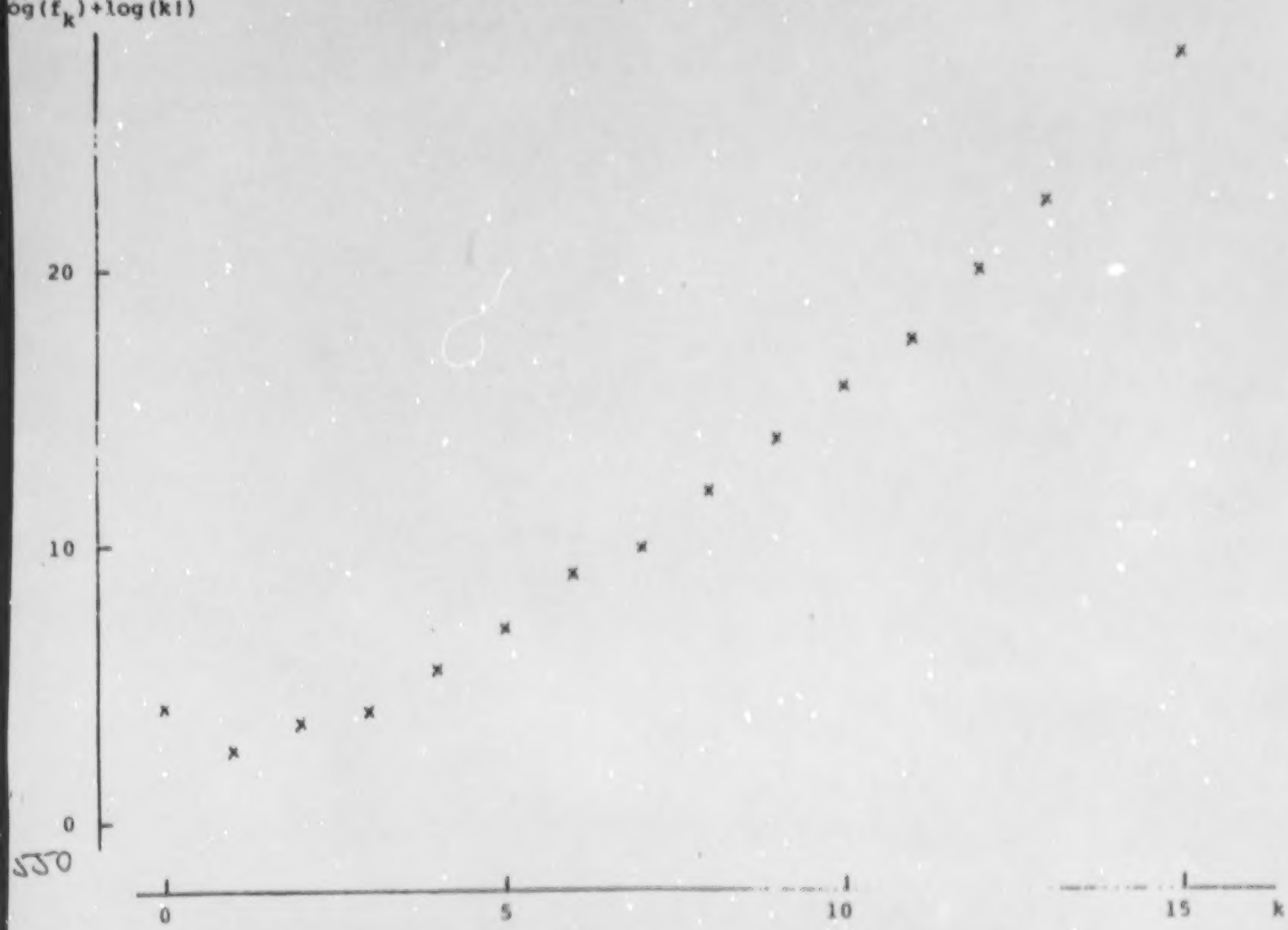


Exhibit 2B-10

Poissonness Plot for Number of Decayed and Filled Surfaces Among Children in the East St. Louis Site



Poissonness Plot for Number of Decayed and Filled Surfaces Among Children in the Phoenix Site

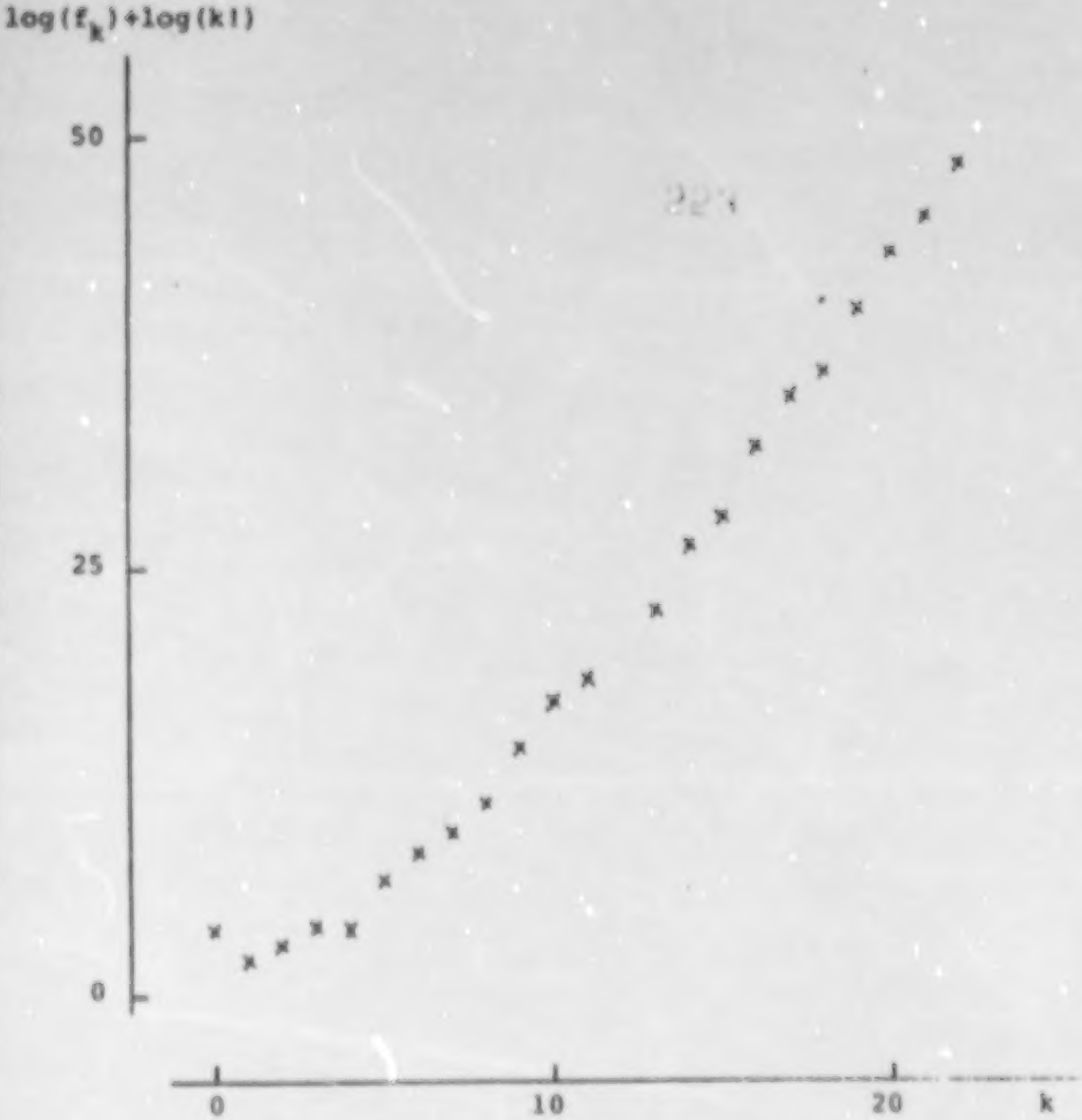
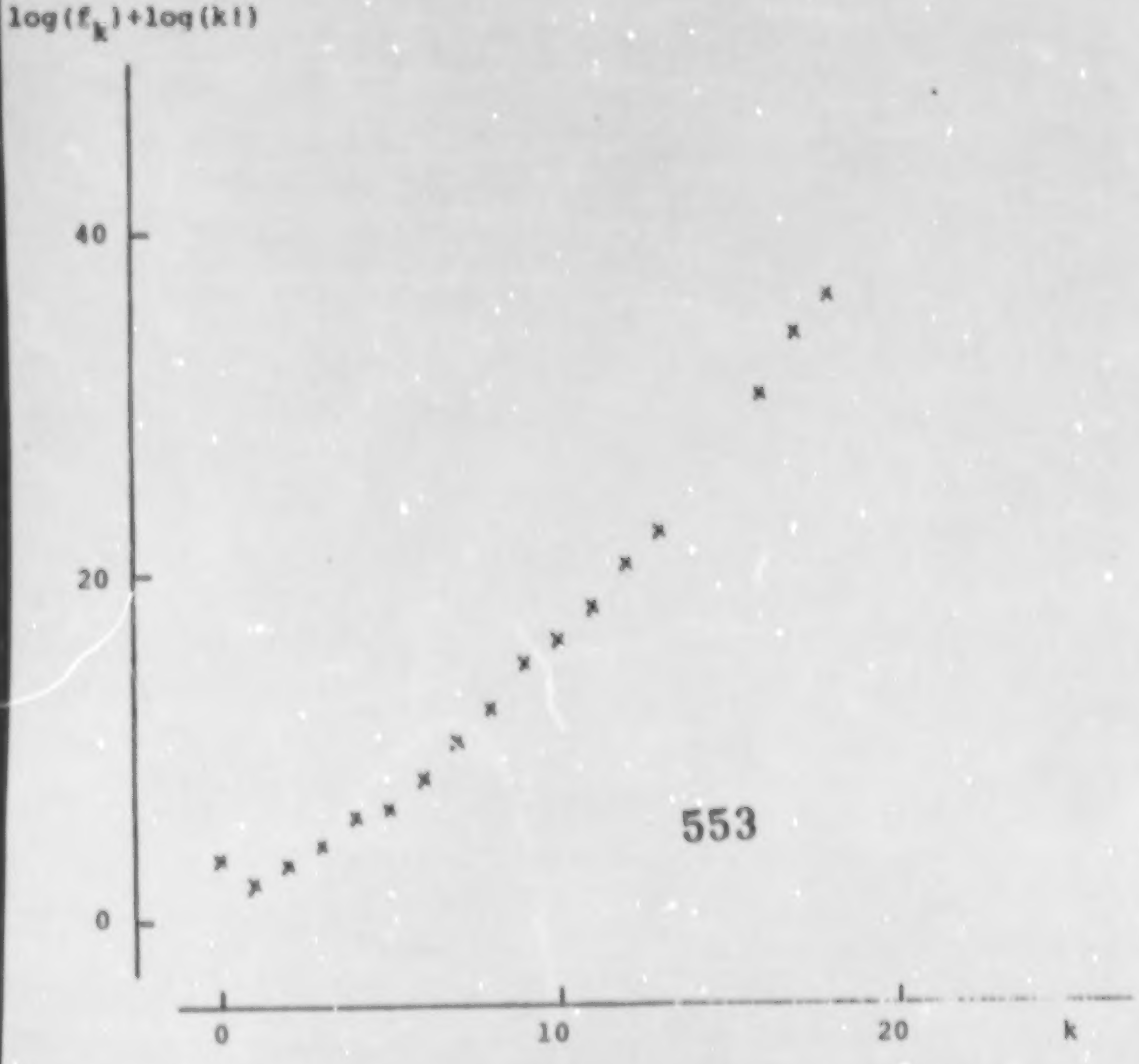


Exhibit 2B-12

Poissonness Plot for Number of Decayed and Filled Surfaces Among Mingo County Children Whose Homes are Served by Well Water



Although getting at the compounding distribution could offer some interesting theoretical possibilities (and, one would hope, some useful findings about the distribution of decay intensity in children), our basic comparisons do not require this step. Ultimately, we need to compare the decay history of the Head Start group and that of the non-Head Start group in each site. If we can accept a Poisson model at the level of the individual child, then we can use the fact that a sum of Poisson variables still has a Poisson distribution (the parameters add). To compare two groups, we simply add up all the decayed and filled surfaces in each group. For this approach to be valid, however, we must be able to believe that the children in one group do not have a greater disposition to tooth decay than those in the other group (at least we need this sort of comparability if we are to draw any conclusions about a Head Start effect). Fortunately, we randomly assigned Wave 1 children to the two groups, and so we have some basis for attributing any difference to the children's participation in Head Start.

For analyses of the incidence of decay and fillings (as measured between the pretest and the posttest), we are able to follow the same general approach as for the data on prevalence. Similar Poissonness plots for the incidence data in each site (not reproduced here) revealed that a compound Poisson model is again plausible.

Consequently, we based comparisons between groups on the total numbers of decayed and filled surfaces for all children in the groups. Because these totals behave as observations from Poisson distributions with large enough parameters, it is reasonable to approximate them by normal distributions that have the same means and variances. That is, if the respective Poisson parameters for the totals are m_{HS} for the Head Start group and m_{NHS} for the non-Head Start group, we approximate the distribution of the Head Start total by a normal distribution with mean m_{HS} and variance m_{HS}, and we approximate the distribution of the non-Head Start total by a normal distribution with mean m_{NHS} and variance m_{NHS}. In view of the different numbers of children in the groups, the null hypothesis of no difference between the Head Start group and the non-Head Start group must be stated in terms of the average numbers of decayed and filled surfaces per child in the groups. If there are n_{HS} children in the Head Start group and n_{NHS} children in the non-Head Start group, the hypothesis states that m_{HS}/n_{HS} equals m_{NHS}/n_{NHS}. We test this by comparing the observed group means, $\bar{x}_{HS}$ and $\bar{x}_{NHS}$, so that we need to determine the appropriate standard error. In general, the variance of $\bar{x}_{HS} - \bar{x}_{NHS}$ is

$$\frac{m_{HS}}{(n_{HS})^2} + \frac{m_{NHS}}{(n_{NHS})^2} ,$$

and under the null hypothesis this becomes

$$\frac{m_{HS}}{n_{HS}} \left[\frac{1}{n_{HS}} + \frac{1}{n_{NHS}} \right] .$$

To obtain a suitable pooled estimate, we observe that $n_{HS}x_{HS} + n_{NHS}x_{NHS}$ estimates $m_{HS} + m_{NHS}$ and that this in turn equals $(n_{HS} + n_{NHS})\ (m_{HS}/n_{HS})$. Then the normal approximations yield the test statistic

$$z = \frac{\bar{x}_{HS} - \bar{x}_{NHS}}{\sqrt{\dfrac{n_{HS}\ \bar{x}_{HS} + n_{NHS}\ \bar{x}_{NHS}}{n_{HS} + n_{NHS}} \left[\dfrac{1}{n_{HS}} + \dfrac{1}{n_{NHS}} \right]}}$$

The foregoing derivation represents a straightforward generalization of the normal approximation described by Brownlee (1960, Section 4.9). The null hypothesis that the average numbers of decayed and filled surfaces per child are the same in the two groups is equivalent to assuming that the Poisson parameters for the totals in the two groups are in a given hypothetical ratio. An exact test derived by Brownlee (Section 4.10) for this case is an alternative to the z-statistic developed above; the two approaches will generally yield similar results.

Finally, the z-statistic derived above can be applied to the numbers of missing teeth among children in the two groups. The change from counting surfaces to counting teeth arises because an entire tooth is the basic unit that can be missing. Thus, a Poisson or compound Poisson model would be concerned with variability at the level of the tooth.

Comparison of Anthropometric Measurements to Reference Data*

Age-specific reference data, representing the normal course of development, allow us to assess the status of the individuals in a sample. Operationally, we may often use the reference data to obtain a mean and standard deviation for each age, and we then score each individual in terms of departure from the reference mean, measured in units of the reference standard deviation. (One might use the corresponding percentile for each individual, but the scores provide a more suitable scale for analysis.)

Even when the (population) reference data are based on a substantial national sample, the number of observations at each age (for definiteness, each year of age) may not be large enough to overcome the greater variability associated with estimates of more extreme percentiles. In comparing an individual to the reference data, the straightforward procedure uses only the percentiles for the individual's age, but we would naturally prefer greater stability. The growth processes are continuous, so we would expect the true 100p-th percentile at a given age to fit in smoothly with the true 100p-th percentiles at nearby ages. Thus, it is reasonable to consider smoothing the age-specific percentiles across ages.

Anthropometric measurements of the upper arm provide a basis for determining a person's nutritional status. Frisancho (1981) has derived norms for such measurements from the data collected by the First Health and Nutrition Examination Survey (NHANES-I). Although the NHANES-I cross-sectional sample contains 19,097 white subjects from age 1 year to age 74, only about 220 males and a little more than 200 females fall into each year of age from 2 years to 6 years (the appropriate age range for Head Start and Head Start-eligible children).

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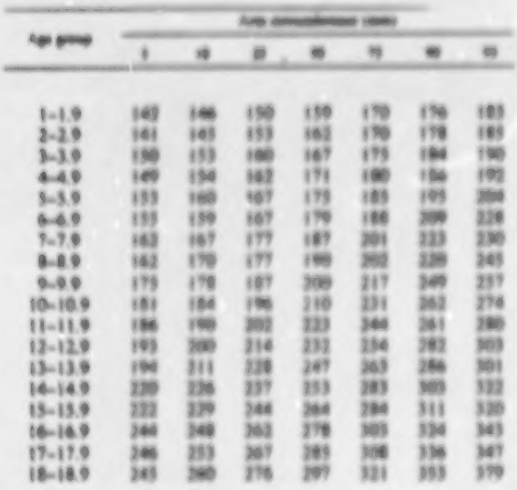
*Much of this section is adapted from the paper by Hoaglin (1982).

The reference data give the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles; and it would not be surprising to see substantial fluctuations in the more extreme percentiles. For illustration, Exhibit 2B-13 gives the age-specific percentiles of upper arm circumference (in millimeters) for white males aged 1 to 18 (the range over which Frisancho gives results by single years of age). Exhibit 2B-14 plots these percentiles, connecting adjacent ages with straight line segments. Although the overall pattern is clear--a somewhat curved increase in level and a regular increase in variability--we see noticeable bumps and wiggles, even in the traces for the 25th and 75th percentiles.

Exhibit 2B-13

Percentiles of Upper Arm Circumference by Age Group
for White Males in the First Health and Nutrition
Examination Survey

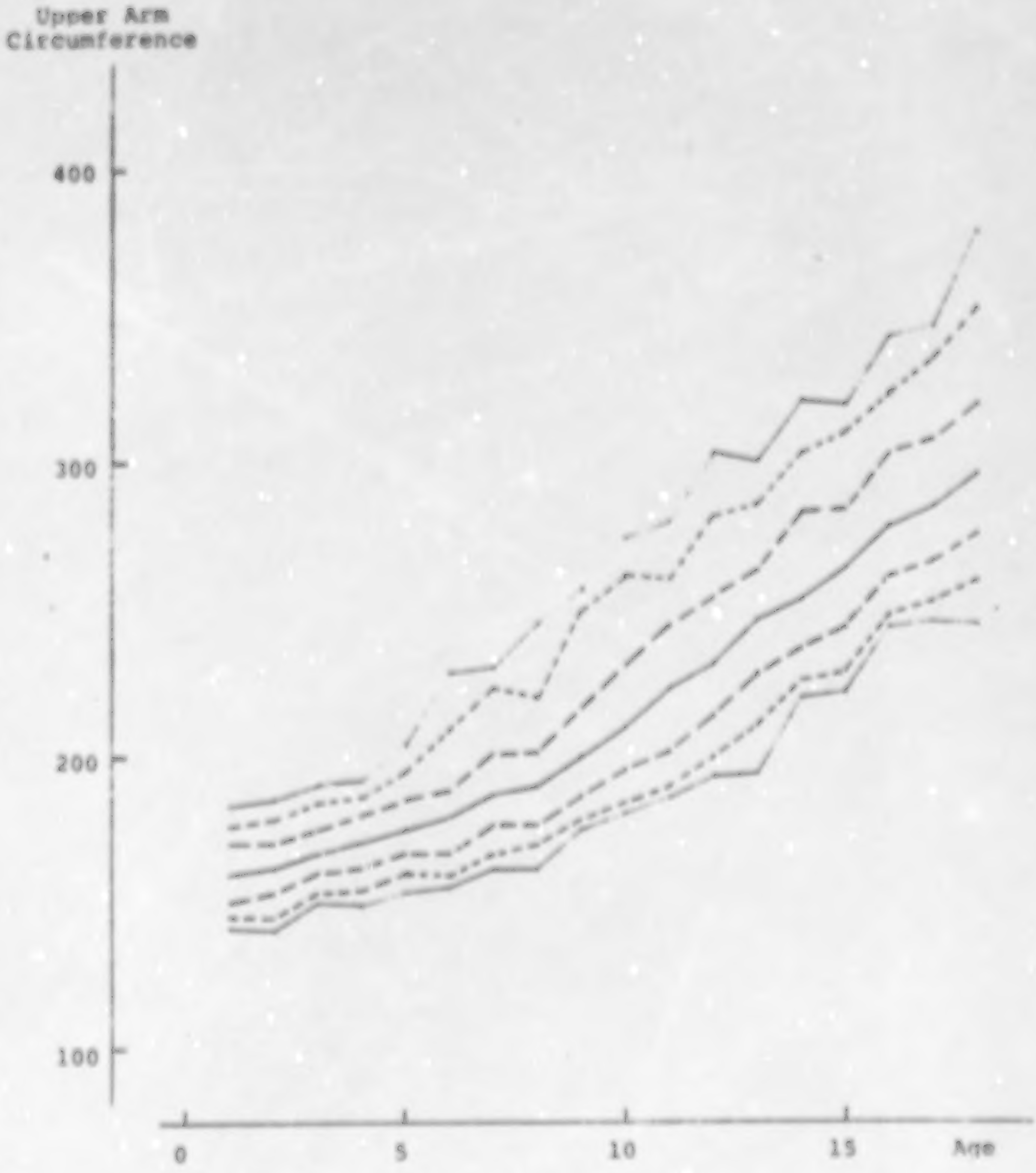


Age group	Arm circumference (mm)						
	5	10	25	50	75	90	95
1-1.9	142	146	150	159	170	176	183
2-2.9	141	145	153	162	170	178	185
3-3.9	150	153	160	167	175	184	190
4-4.9	149	154	162	171	180	186	192
5-5.9	153	160	167	175	185	195	204
6-6.9	155	159	167	179	188	209	228
7-7.9	162	167	177	187	201	223	230
8-8.9	162	170	177	190	202	220	245
9-9.9	175	178	187	200	217	249	257
10-10.9	181	184	196	210	231	262	274
11-11.9	186	190	202	223	244	261	280
12-12.9	193	200	214	232	254	282	303
13-13.9	194	211	228	247	263	286	301
14-14.9	220	226	237	253	283	303	322
15-15.9	222	229	244	264	284	311	320
16-16.9	244	248	262	278	303	324	343
17-17.9	246	253	267	285	308	336	347
18-18.9	245	260	276	297	321	353	379

Source: Frisancho (1981), Table 2 on page 2542.

Exhibit 2B-14

Percentiles of Upper Arm Circumference versus Age



Smoothing and Delineation

To obtain more stable estimates, especially for the more extreme percentiles, we smooth across ages. For protection--in principle and here, to some degree, in practice--against isolated unusual behavior, we gain by using a resistant nonlinear smoothing procedure. The basic ideas and motivation come from Tukey (1977), and the actual smoother is the one known as "4253H,twice", described in detail by Velleman and Hoaglin (1981) and studied by Velleman (1980).

The most direct approach for smoothing the age-specific percentiles across ages considers each percentile as a separate sequence. Thus, we would apply our resistant nonlinear smoother to each of the seven columns of data in Exhibit 2B-13.

Treating the percentiles separately in this way, however, ignores the constraint of order that the resulting smoothed sequences must satisfy. That is, for each year of age, the smoothed 10th percentile must not be less than the smoothed 5th percentile and so on. This is equivalent to requiring that the difference between the smoothed 10th percentile and the smoothed 5th percentile (for example) be nonnegative at each age.

The age-specific differences between successive percentiles in the data satisfy this order relationship, and the resistant nonlinear smoother will produce a nonnegative smooth sequence when the data sequence is nonnegative, so we can smooth across ages and preserve the order relationship by working with the sequences of differences. The model for this approach is the "delination" in exploratory data analysis (Tukey, 1977, Chapter 9).

As originally developed, the delineation applies to batches of (x,y) data in which the x-values have not already been grouped into a regular set of intervals. Customarily, the amount of data will be far smaller--perhaps only a couple of hundred observations. Thus, one begins by slicing the data, parallel to the y-axis, at the x-median, the lower and upper x-hinges, the lower and upper x-eighths, and so on (until the data become too thin). Within each of the groups thus formed, one concentrates on the y-values, calculating their median, hinges, and so on. One then forms differences between these y-summaries, working outward from the median, smooths the sequence of medians and the sequences of differences, and recombines the smoothed sequences.

Application to Age-Specific Percentiles

In the present situation we are given a set of percentiles, and we have the advantage of being given equally spaced x-values (the ages)--the preferred form of sequence for smoothing.

In this form of delineation, we form differences, working outward from the median. If we denote the percentiles of upper arm circumference by C_5 through C_{95}, the process goes as follows.

- Extract the age-specific medians, C_{50}. Exhibit 2B-15 plots these against age. This sequence already appears quite smooth, the main reason that it serves as the base in building the smoothed age-specific percentiles.
- Calculate differences between successive age-specific percentiles: $C_{10} - C_5$, $C_{25} - C_{10}$, $C_{50} - C_{25}$, $C_{75} - C_{50}$, $C_{90} - C_{75}$, $C_{95} - C_{90}$. Exhibit 2B-16 plots these six sequences of differences. A fair amount of irregular behavior stands out--more clearly here than in Exhibit 2B-14.
- Smooth the sequence of age-specific medians. The result for the data on upper arm circumference appears in Exhibit 2B-17, which differs only slightly in appearance from Exhibit 2B-15.
- Smooth the sequences of differences, $C_{10} - C_5, \ldots, C_{95} - C_{90}$. As Exhibit 2B-18 shows, the smoothed sequences look satisfactorily regular, even though not all are strictly increasing.

  ing.
- Recombine the sequences of smoothed differences and the sequence of smoothed medians, as in ("Sm" indicates smoothed)

$$\mathrm{Sm}(C_{50}) + \mathrm{Sm}(C_{75} - C_{50})$$

and

$$\mathrm{Sm}(C_{50}) - \mathrm{Sm}(C_{50} - C_{25}).$$

The resulting sequences are the cross-age smoothed estimates of the age-specific percentiles. Exhibit 2B-19 suggests that, in the example, the smoothed version provides a more plausible and more satisfactory description of the relationship between upper arm circumference and age.

Exhibit 2B-15

Median of Upper Arm Circumference, C_{50}, versus Age

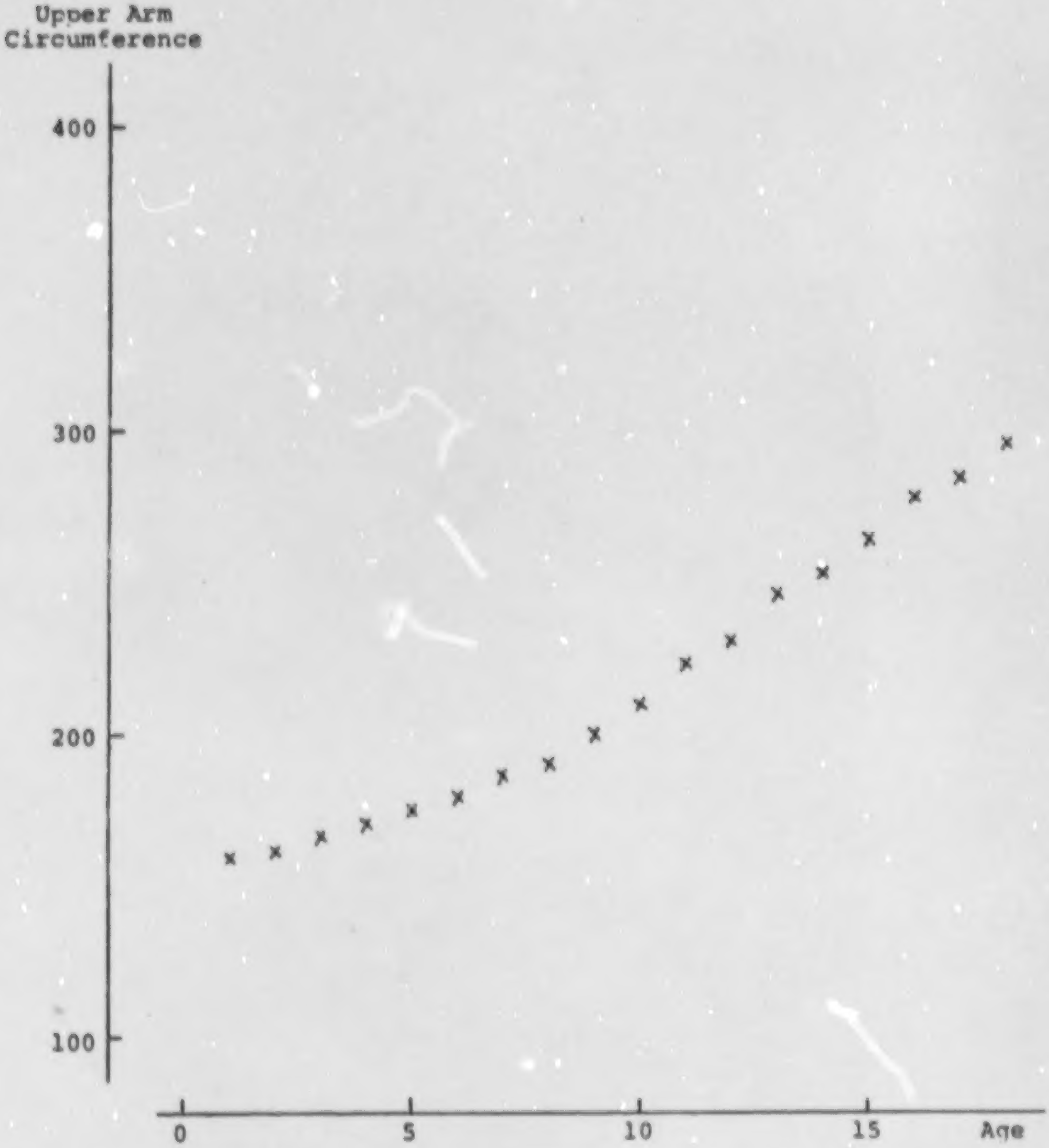


Exhibit 2E-16

Inter-percentile Differences versus Age

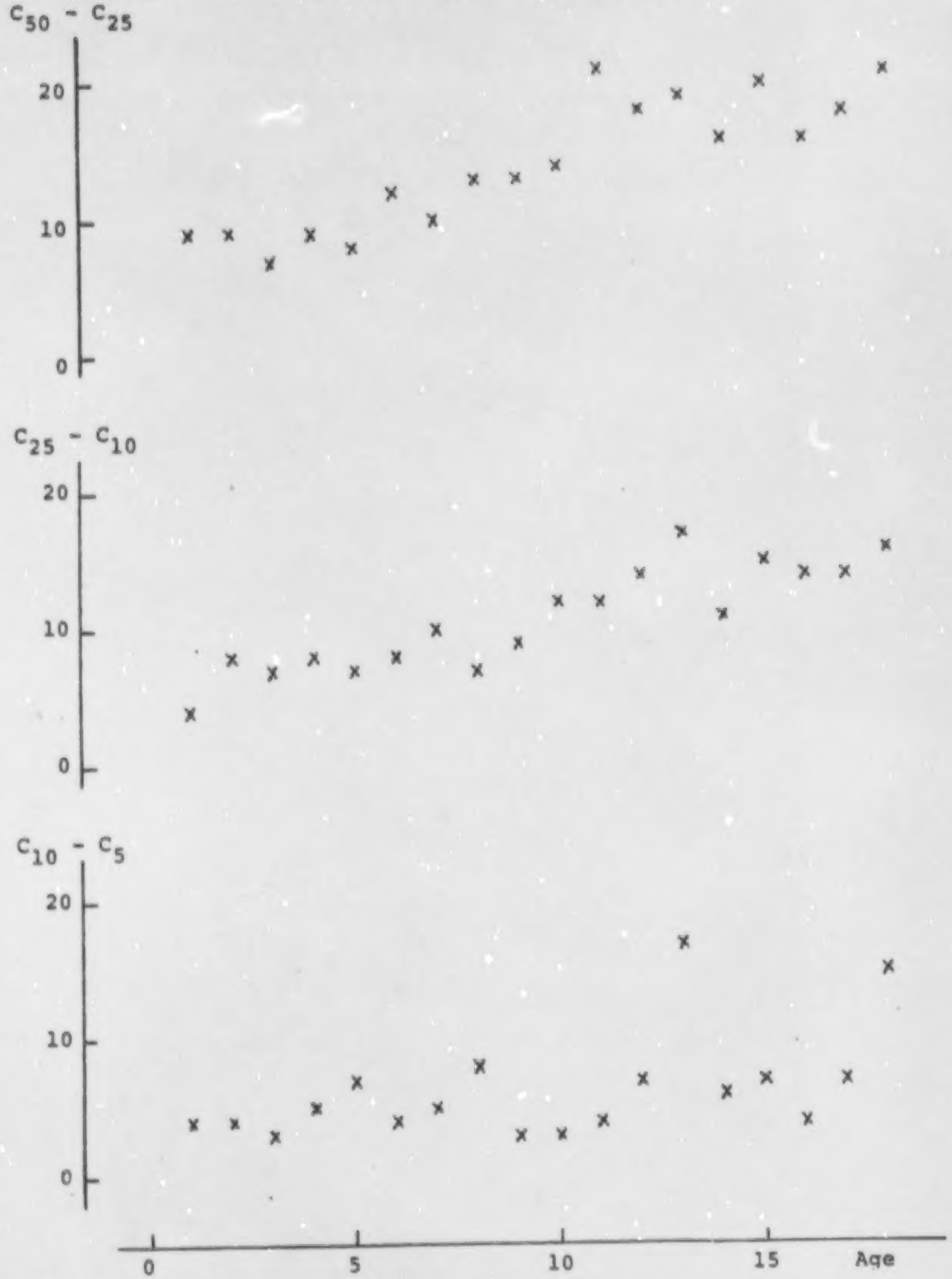


Exhibit 2B-16

(continued)

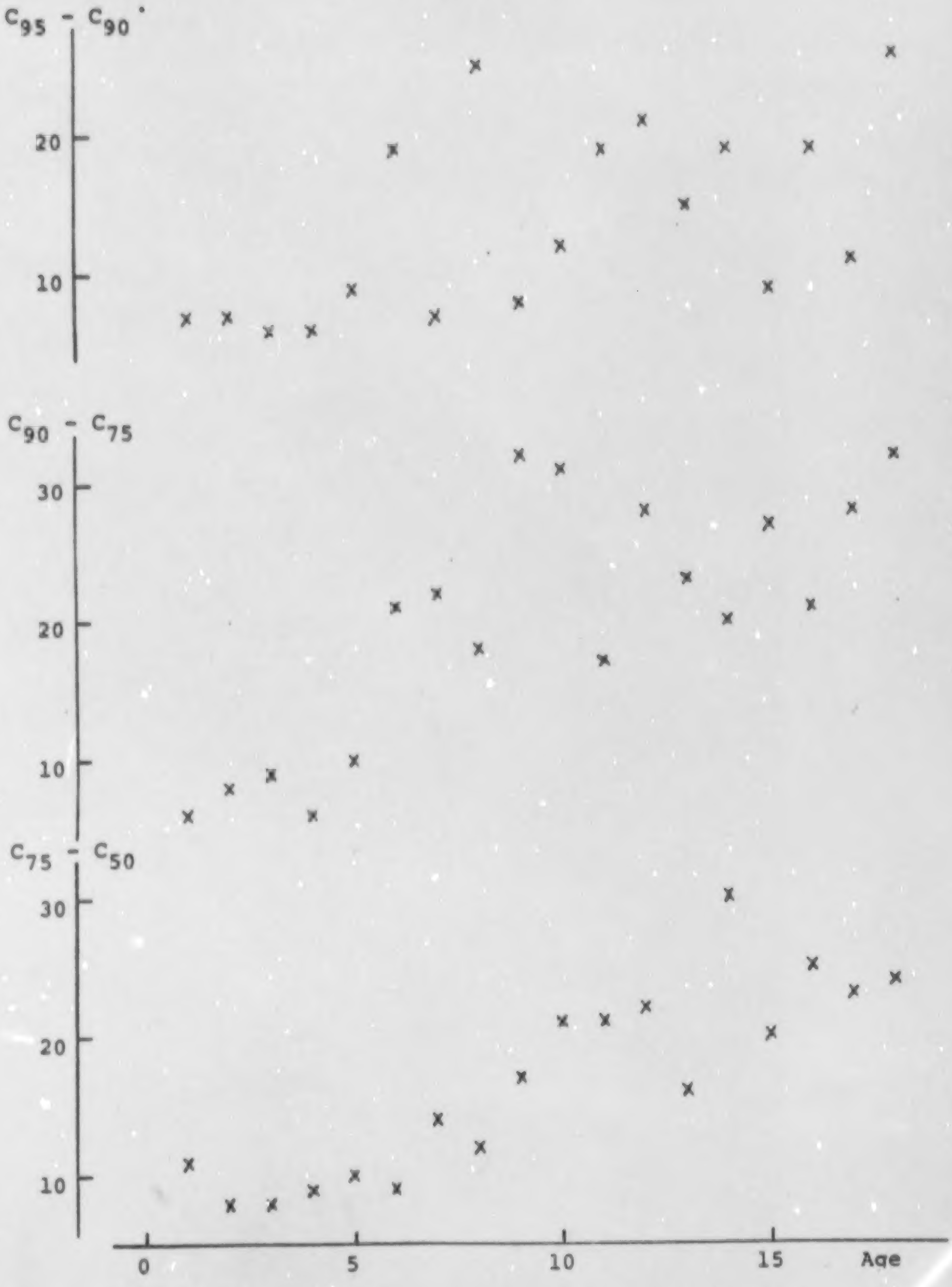


Exhibit 2B-17

Smoothed Median Upper Arm Circumference versus Age

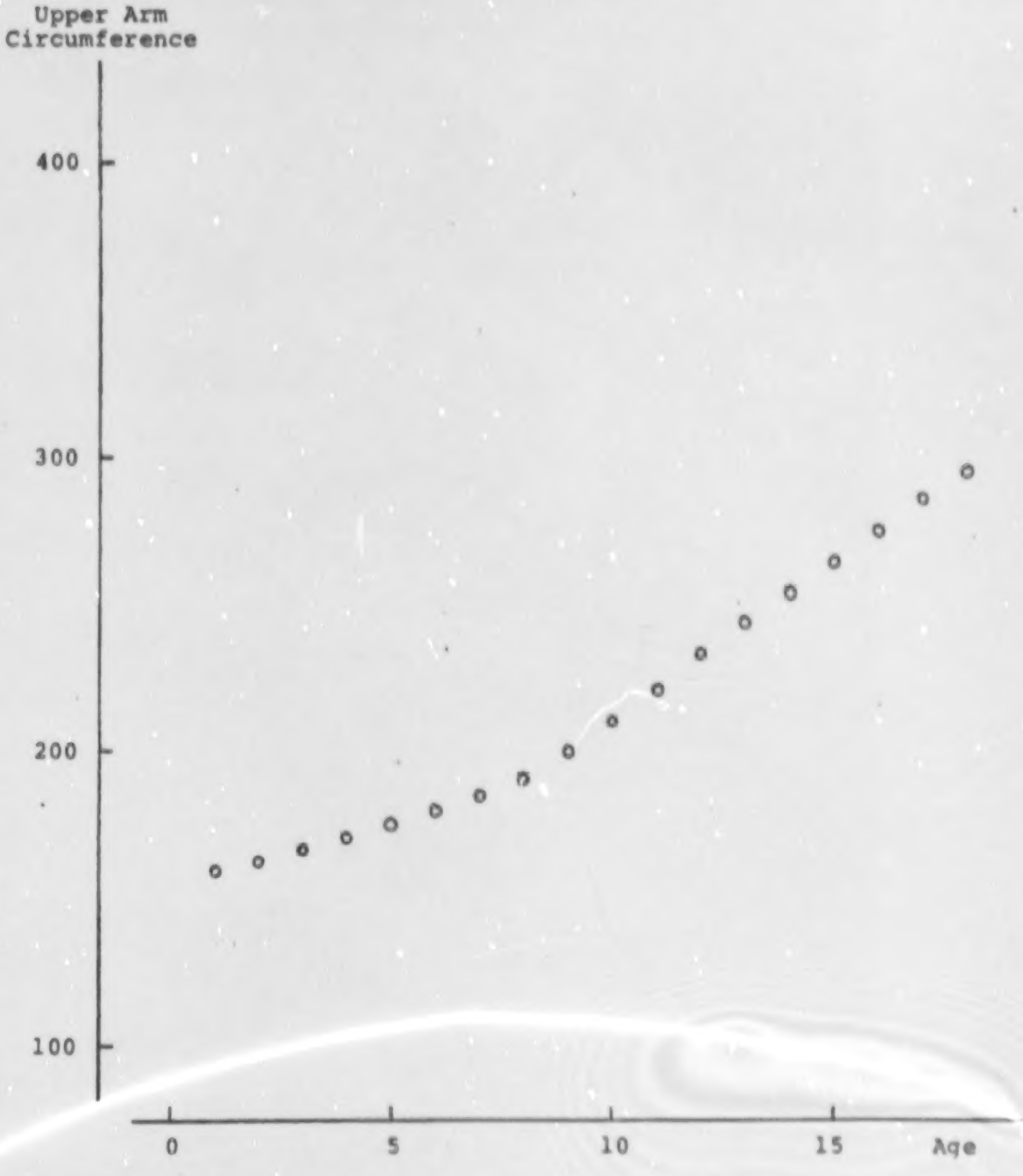


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Exhibit 2B-18

Smoothed Inter-percentile Differences versus Age

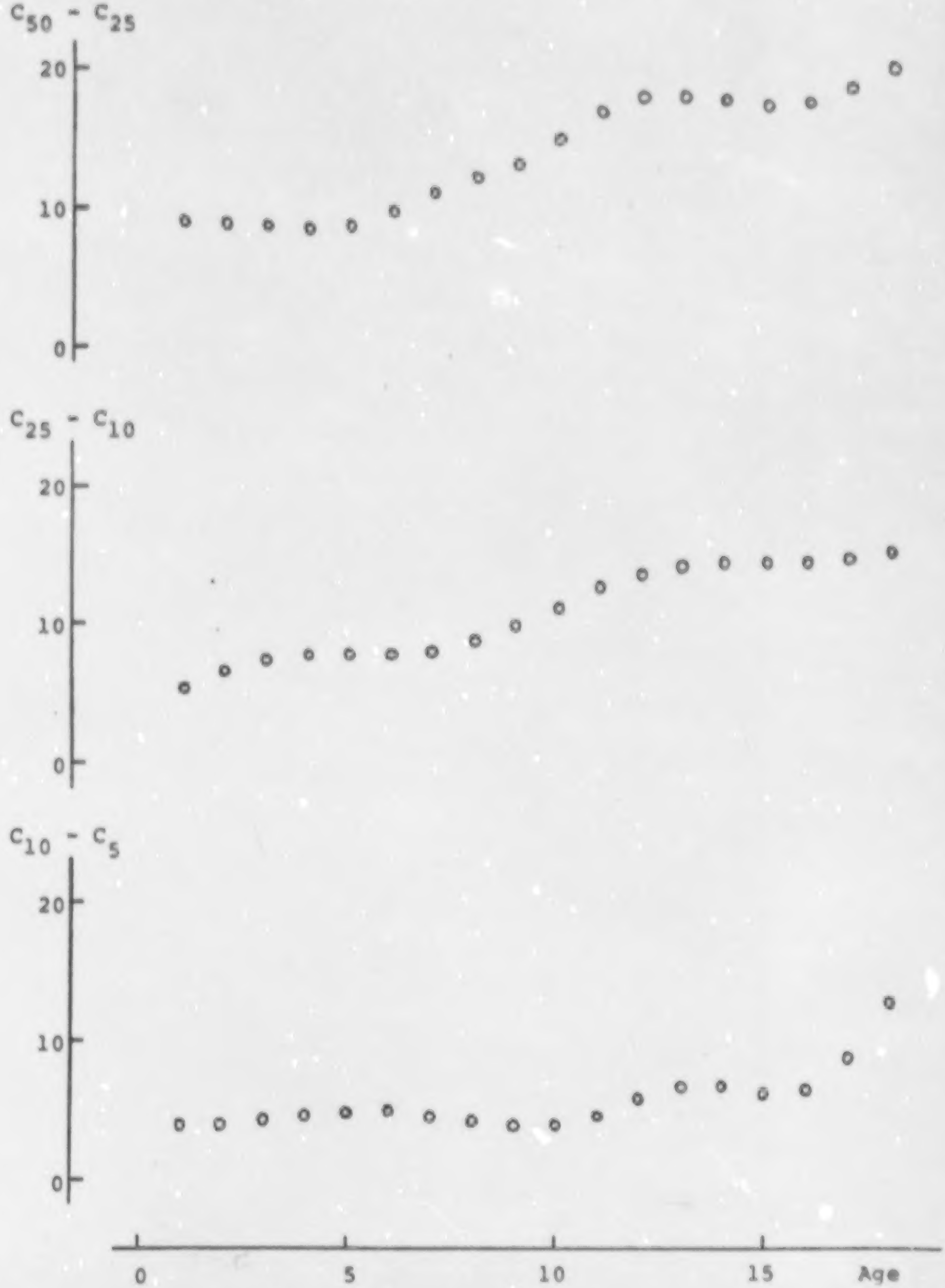


Exhibit 2B-18

(continued)

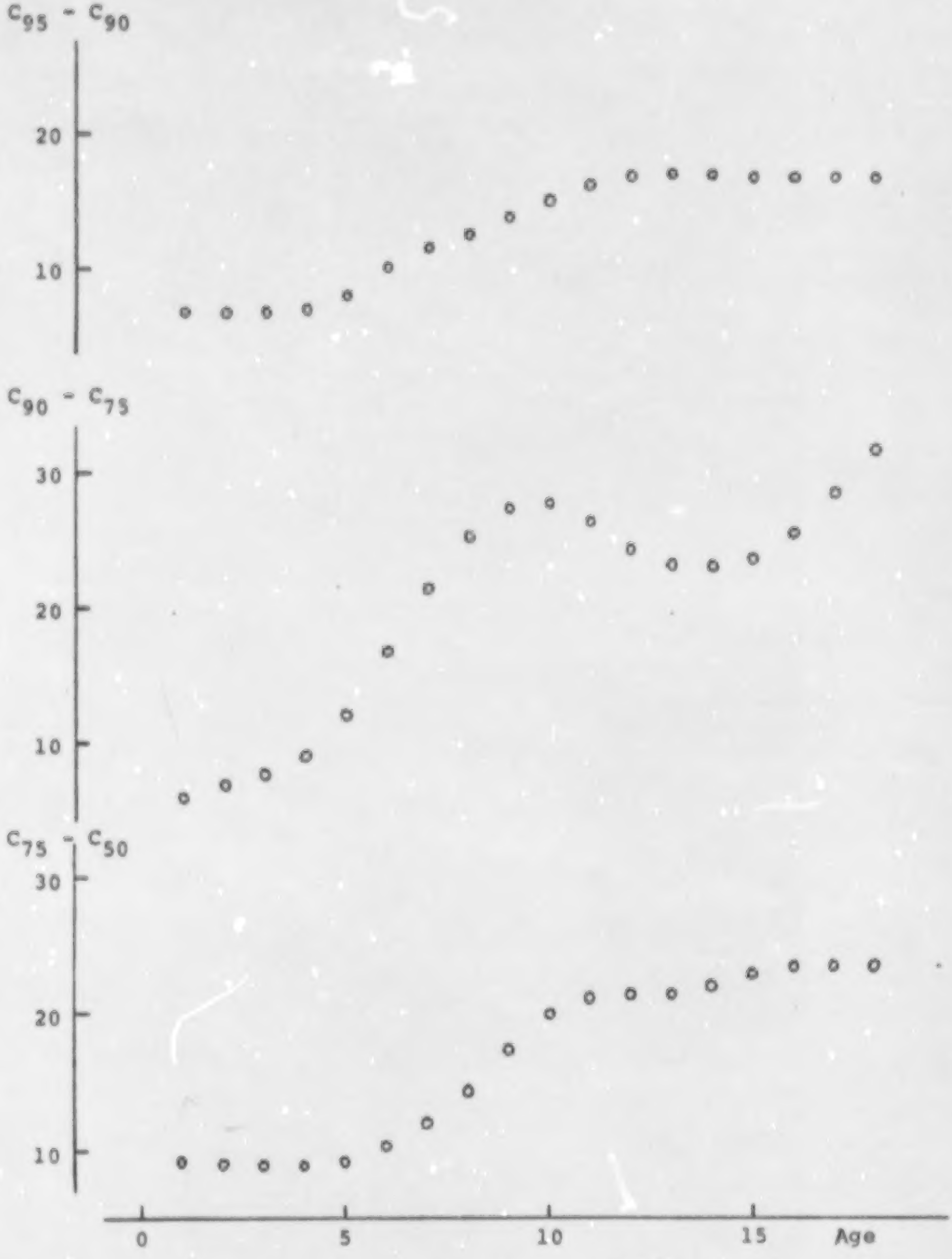
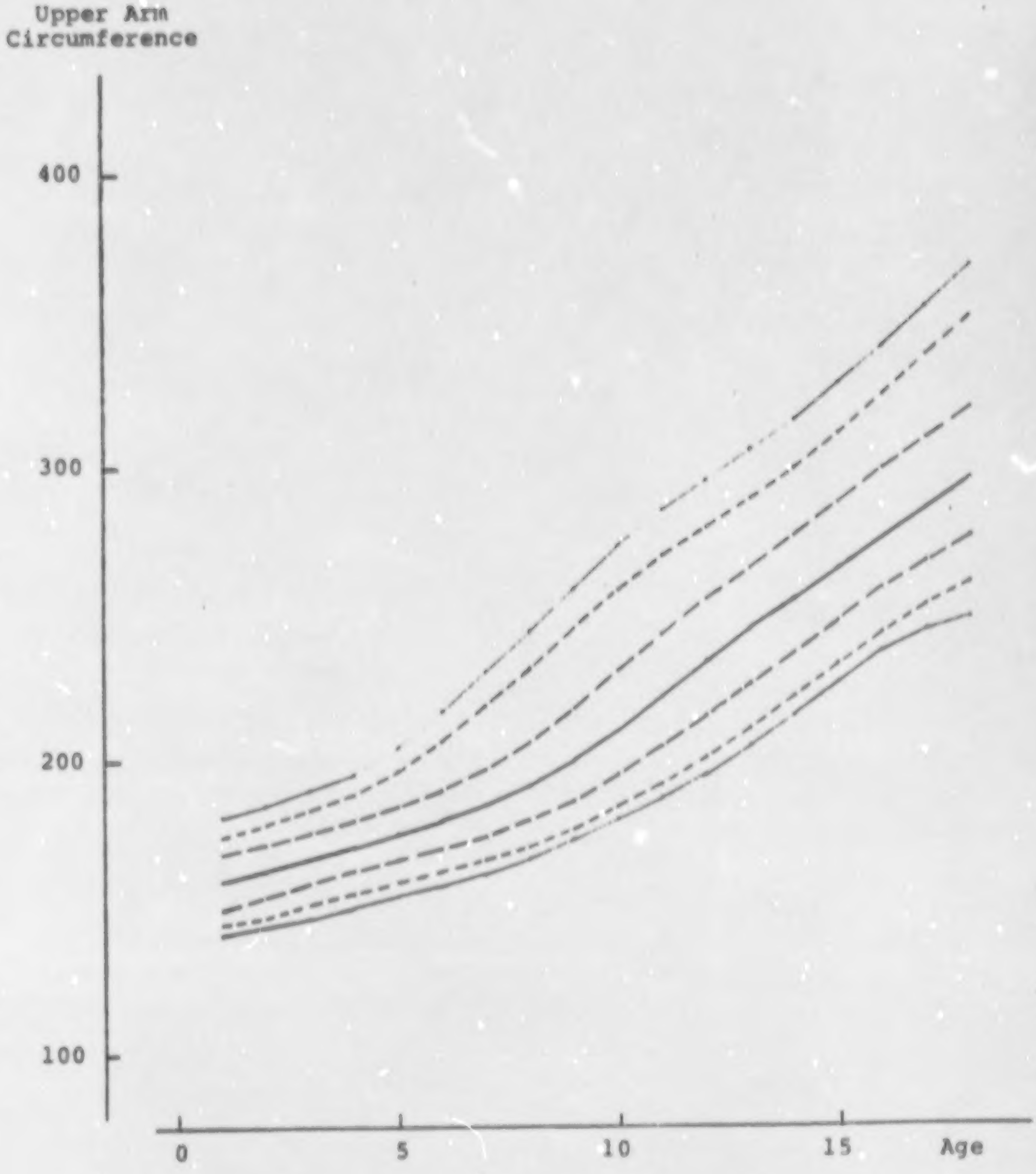


Exhibit 2B-19

Smoothed Percentiles of Upper Arm Circumference versus Age



Superimposing Exhibit 2B-19 on Exhibit 2B-14 would reveal that the smoothed percentiles adequately capture the behavior of the raw percentiles and merely remove the wiggles, some of which are troublesome.

Age-Specific Means and Standard Deviations

In analyzing the anthropometry data, we assigned each child a score of the form

$$\frac{\text{(child's measurement)} - \text{(age-and-sex-specific mean)}}{\text{(age-and-sex-specific standard deviation)}}$$

on each of three variables: triceps skinfold, upper arm circumference, and arm muscle circumference. To obtain the age-and-sex-specific means and standard deviations, we applied the smoothing technique described earlier in the present section to the reference data published by Frisancho (1981), taking the age-and-sex-specific percentiles for ages 1 through 10 years (in part to avoid some end effects that can propagate when smoothing short sequences). After calculating the smoothed age-and-sex-specific percentiles, we made quantile-quantile plots (Wilk and Gnanadesikan, 1968) to refer those percentiles to the normal distribution. Although these plots did not show perfect agreement, they did indicate that normal distributions adequately approximate the age-and-sex specific distributions of the three variables over the range of ages that one encounters in Head Start and Head Start-eligible children. Thus, the mean and standard deviation are sufficient to describe the distribution and can be used in calculating scores for the individual children. Exhibit 2B-20 records the means and standard deviations that emerged from this process of fitting normal distributions to the three anthropometry variables.

Exhibit 2B-20

Age-and-Sex-Specific Means and Standard Deviations Obtained by Fitting Normal Distributions to Smoothed Percentiles of Triceps Skinfold, Upper Arm Circumference, and Arm Muscle Circumference

	Age Group	Males		Females	
		mean	std. dev.	mean	std. dev.
Triceps skinfold (mm)	1-1.9	10.3	2.9	10.4	2.9
	2-2.9	10.2	2.9	10.4	2.9
	3-3.9	10.0	2.8	10.4	2.9
	4-4.9	9.8	2.7	10.4	2.9
	5-5.9	9.6	2.8	10.5	3.0
	6-6.9	9.5	2.9	10.7	3.2
Upper arm circumference (mm)	1-1.9	159.8	12.5	156.6	11.7
	2-2.9	162.7	12.5	161.0	12.0
	3-3.9	166.8	13.0	166.0	12.9
	4-4.9	171.7	13.3	170.6	13.9
	5-5.9	177.4	14.7	174.9	15.7
	6-6.9	182.1	17.2	180.6	18.2
Arm muscle circumference (mm)	1-1.9	126.9	11.5	124.4	11.4
	2-2.9	131.3	11.4	127.8	11.6
	3-3.9	136.2	11.4	132.0	11.8
	4-4.9	141.4	11.6	137.0	12.0
	5-5.9	146.5	12.0	142.0	12.2
	6-6.9	152.5	12.6	148.0	12.9

TECHNICAL APPENDIX 2C

DESCRIPTIONS OF THE HEAD START PROGRAM SITES AND SAMPLES OF CHILDREN

Head Start Site and Program Characteristics

The Head Start programs selected for the Head Start Health Evaluation were chosen according to site characteristics such as county-wide population characteristics and specific program characteristics. In general, site was synonomous with the geographic area of the county served by the Head Start program grantee. There were exceptions; the Head Start grantee selected in Mississippi (Friends of Children) served children in four counties when chosen, but added 11 more counties during the 1980-1981 program year. The most medically underserved counties, Greene and Humphreys Counties, had small Head Start programs, too small for inclusion in the evaluation. Consequently, both medically underserved counties, although they were geographically remote, were selected.* Another exception to the definition of site as the county served by the Head Start program grantee was the Head Start grantee in Arizona. Maricopa County is very large, nearly 100 miles by 100 miles. To provide better service to the children, three Head Start grantees serve the county's children: the City of Phoenix grantee for children within the city limits, an Indian and Migrant grantee for migrant children and those on Indian reservations, generally on the outer perimeter of the county, and the Maricopa County Community Services Department grantee program for children in the suburban communities surrounding Phoenix. The latter was the program included in the evaluation.

In general, the two remaining sites, St. Clair County (Illinois) and Mingo County (West Virginia) were represented by children from the entire county. Whereas, in theory, the Head Start program in each of these sites served children from the entire county, in practice the catchment area was more restricted and depended on availability of transportation and distribution of the Head Start centers. Exhibit 2C-1 provides the characteristics of the population in each of the sites (five

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*Analyses of the data from both of these counties demonstrated that the characteristics of the children were very similar and could be combined into one "site."

Exhibit 2C-1

Demographic Characteristics According to 1980 Census Data of Sites in Head Start Health Evaluation

Demographic Characteristics	Greene County	Humphreys County	St. Clair County	Maricopa County	Mingo County
Total Population					
1960	8,466	19,093	262,509	663,407	39,742
1970	8,545	14,601	285,176	971,228	32,780
1980	9,827	13,931	265,469	1,508,030	37,336
Percent Change					
1960-1970	1.1	-23.5	8.6	46.4	-17.5
1970-1980	15.0	-4.6	-6.9	55.3	13.9
Land Area, Sq. Mi.	728	421	673	9,155	423
Population Density[a]	13.5	33.1	394.5	164.7	88.3
Largest Community	Leakesville	Belzoni	East St. Louis	Phoenix	Williamson
Population	1,090	3,146	69,996	581,573	5,631
Area, Sq. Mi.	-	4,494	5,036	2,346	2,011
Pop. Density[a]	-	0.7	13.9	247.9	2.9
Population by Community Size					
Percent Rural	100.0	78.5	16.8	6.6	82.1
<1000	87.2	78.5	13.2	6.6	78.7
1000-2500	12.8	-	3.6	-	3.4
Percent Urban	-	21.5	83.2	93.4	17.9
Low Density	-	21.5	5.8	-	17.9
High Density	-	-	77.4	93.4	-
Ethnic Distribution					
White	79.7	33.9	71.2	86.6	96.9
Black	20.1	65.6	27.7	3.2	2.9
Other	.2	.5	1.1	10.2	.2
Health					
Number Physicians	3	5	216	2341	31
Rate/100,000	34	35	77	199	90
Number Hospitals	1	2	6	29	1
Beds/100,000	324	699	595	516	294
Education: Adult Women					
Median Years	10.4	8.5	9.3	12.7	8.7
Percent Completed High School	37.5	26.5	35.9	58.4	25.3

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[a] Population Density = Persons per square mile.

571

counties) included in the evaluation. A description of the demographic characteristics of each county and its Head Start Program follows.

Greene (Leakesville) and Humphreys (Belzoni) Counties, Mississippi. The Mississippi site provided a unique blend of characteristics. Unlike the other three sites, this site encompassed two counties which are geographically distinct and separated by a distance of over 200 miles.

Greene County is located in the southeast corner of the state, bordering Alabama. It is predominantly rural. In 1970, 63 percent of the work force was employed in lumbering or manufacturing in several large garment factories located in or near the principal communities. According to the 1980 census Greene County had a population of 9,827, of whom 80 percent were white and 20 percent were black. The population was relatively stable, although, according to the county clerk, "There is hardly enough industry in the county to keep high school graduates here once they graduate." In 1970 the unemployment rate was 6.0 percent, and 49 percent of the family incomes were below 125 percent of the poverty level. The median family income was $4,565. Greene County also suffered from inadequate medical services. There was a shortage of physicians and accessible hospital care in the area. Until recently, there was no dentist in the whole of Greene County.

Humphreys County, situated in north central Mississippi, is largely agricultural; only 21.5 percent of the population lives in a non-rural setting. Humphreys County, 66 percent black and 34 percent white, had a population of 13,931 in 1980, a decrease of 4.6 percent since 1970. Most of the population was employed in farming or other agricultural trades; the unemployment situation was slightly better than in Greene County, with only 4.6 percent of the labor force out of work in 1970. Sixty-one percent of all families in Humphreys County had incomes below 125 percent of the poverty level. The median family income in 1969 was $3,331.

Although Humphreys County was somewhat better served medically than Greene County, inadequate medical care was still a problem. The majority of the residents travel to Belzoni, a distance as far as 20 miles, to use the limited services available there; the poorest segment of the population used them least. Dental problems, poor eating habits and inadequate dental hygiene were considered the greatest health problems in the county. Other common characteristics of Greene and Humphreys Counties included the following: substantial percentages of the population were below the poverty level (39% and 54%); many of the families were receiving Aid for Dependent Children (26% and 83%); and the median years of education of adult women was low (10.4 and 8.5 years).

The Head Start grantee is Friends of Children; offices are located in central Mississippi in Jackson. After the beginning of the evaluation, Friends of Children expanded its Head Start program. In addition to the centers in Greene and Humphreys Counties, Friends of Children presently operates centers in 11 other counties and is funded to serve 3,700 children. In the 1980-1981 program year, the actual enrollment, including dropouts, was 4,278 children. The administrative staff of each county Head Start program worked out of separate county offices under the direction of the central office in Jackson.

Five centers in Greene County served approximately 230 children in a three-year program. Seventy percent of the children were black and 30 percent white, although this varied from center to center. For example, two centers with a combined enrollment of 79 served only three white children. In contrast, one center serving 40 children was entirely white. These numbers are indicative of persistent residential segregation in the county and disproportionate utilization of Head Start by the black community. The Humphreys County program operated three centers. Less than one percent of the 390 children served by these centers were white.

Children in both counties attended Head Start five days each week, six and one-half hours per day. In both Greene and Humphreys Counties, there was a great awareness that many children needed medical services. A common sentiment expressed by staff of the health departments in both counties was that the most crucial step in improving the health of the children was parent education. A staff member of the Greene County Health Department, for example, explained that the health department examined and referred many children with dental problems, but that these recommendations frequently were not followed up by parents.

St. Clair County (East St. Louis), Illinois. St. Clair County, located in southwestern Illinois, is a predominantly urban county, just across the Mississippi River from St. Louis, Missouri. In 1970, the major industries in the area were manufacturing (metal products), construction (highway, civil), and railroads and railway express services. According to the 1980 Census, St. Clair County had a population of 265,469, of whom 28 percent were black and six percent were unemployed (in 1970).

East St. Louis, the county's largest city, was densely populated and 70 percent black. Thirty-eight percent of all black families in East St. Louis had incomes below 125 percent of the poverty level. Median annual income for black families (according to the 1970 Census) was $5,255, well below the median income of $6,857 for families of other racial backgrounds.

East St. Louis showed many signs of a city experiencing a serious decline. Unemployment was high; by 1970, 11.5 percent of the work force was unemployed. The city had a high crime rate: 14,007 serious or violent crimes per 100,000 persons per year. Many of the residents lived in housing projects, generally considered to be in ill repair. This combination of high unemployment, high crime rate and poor housing accounted for the decrease in the city's population over recent years. Between 1960 and 1970 the population declined by 14.7 percent. This decline accelerated between 1970 and 1980 to a 21 percent decrease. Evidence of this exodus could be seen in numerous abandoned businesses, residential buildings, and entire shopping areas. The streets were generally deserted, and many areas of the city had an almost "ghost town" atmosphere.

The Head Start grantee was the Economic Opportunity Commission of St. Clair County, which is actively involved in attempting to increase training and job opportunities in the area and to provide adult education. The main offices for the Head Start program are located in East St. Louis. Approximately 90 percent of the Head Start children came from this community. The Head Start staff was composed of five administrators and 80 teachers or assistant teachers. Ninety percent of the staff were black, nine percent were white, and one percent was Hispanic. In the 1980-81 school year, the program was funded for 650 children between three years and five years of age, in a two- to three-year program. Including dropouts and enrollments, the program served 899 children. There were 13 Head Start centers, with a total of 26 classrooms. Centers were open four days a week. Children attended either two-day or four-day sessions and were generally in class six hours per day. The racial composition of the 1980-81 enrollment was approximately 80 percent black, 19 percent white, and one percent other.

Five of the program's 13 centers were located in small towns around East St. Louis; the remaining eight were located within East St. Louis proper. The five outlying centers were located in the towns of Lovejoy (with two centers), Cahokia, Belleville and Lebanon, and accounted for 25 percent of the enrolled children. These centers ranged from approximately 5 miles from East St. Louis (Lovejoy) to 50 miles (Lebanon).

Although parent involvement in Head Start was one of the program's goals, public transportation was poor in East St. Louis proper, and thereby created a huge barrier to achieving this goal. Most of the families served by the program did not have cars, and therefore transportation services had to be provided. The program found it difficult to support an adequate transportation staff with available funds. Head Start staff expressed strong feelings that the high crime rate and transportation difficulties made many women afraid to leave their homes after dark. Since many Head Start families were single-parent families headed by women, this reluctance greatly limited parent participation in evening activities.

Maricopa County (Phoenix), Arizona. Maricopa County sprawls out on the flood plain of the Salt River. The center of the county is Phoenix, the capital of Arizona. According to the 1980 Census, the county had a population of over 1,508,030 people, predominantly urban. Agriculture, possible year-round with the advent of sophisticated irrigation techniques, and manufacturing were the major employers in the area. Unemployment was not then an enormous problem. In 1970, 3.9 percent of the labor force was unemployed, and only 13 percent of all families had incomes below 125 percent of the poverty level. The median family income in 1974 was $9853 and the median years of education of adult women was 12.7 years--high compared to the other three sites. In general, the usual sources of income were migrant farm work, mining and unskilled labor.

Arizona had no Medicaid system, but provided state health care through primary care centers of the county health department located in Phoenix and various suburban towns. The towns without such centers, El Mirage and Guadalupe, were medically underserved, with few or no private doctors.

The Head Start grantee, Maricopa County Community Services Department, served eligible children outside the city limits of Phoenix and not within the catchment of the Indian and Migrant Program. Main offices are located in the outskirts of Phoenix. The program grantee, the Maricopa County Board of Supervisors, operated 18 classes in 12 centers, each located in a different town. Some of the centers were up to 50 miles from the main offices. (The evaluation focused on children residing in suburban communities to the northwest and southeast of Phoenix, rather than on the entire county.) The Head Start staff was composed of four administrators and 71 teachers and classroom staff and home visitors. Funded for 419 children, the program served 458 children at some time during the 1980-81 school year. Children attended school three-and-one-half to four hours per day, four days each week. Some centers operated two half-day programs each day. Approximately 68 percent of the children were Hispanic, 20 percent were white, and the remainder were black, Native American or Asian.

The Head Start center program was a one-year program for four-year olds. In addition, a home-based component served approximately 88 three-year-old children. Until recently, transportation was a barrier to Head Start participation. Previously, families were required to provide their own transportation. However, during the 1980-81 program year, Head Start received funding for an experimental busing program that both Head Start staff and parents feel had greatly increased participation.

Some migrant and undocumented workers' children are served by the Maricopa County Head Start Program. Families of farm workers must constantly move around this large county as certain crops are grown and harvested. This rotation caused the classrooms to constantly shift enrollment, but most of the children remained in Maricopa County Head Start even though they changed classrooms over the year. Remaining in the Head Start program is important for many of these children since Head Start is frequently the only means of access to health services. Any child enrolled in Head Start is eligible for health services through a contractual agreement with the Maricopa County Health Department, irrespective of eligibility for other public assistance. Otherwise, families without the green (eligibility) card cannot receive services at the health department unless they pay for the health services themselves.

Mingo County (Williamson), West Virginia. Mingo County, West Virginia describes itself as "the Heart of the Billion Dollar Coal Field." According to the 1980 Census, the county's population was 97 percent white and three percent black. The county is located in southwestern West Virginia, bordered on one side by Logan and McDowell Counties and on the other by the Tug Fork of the Big Sandy River. Across the river is Pike County, Kentucky. These two counties, separated by the river, were the setting for the historic feud between the Hatfields and the McCoys.

The county is predominantly rural, and much of its character stems from the terrain and the mining industry on which it depends. The land is mountainous, with "flat lands" few and far between. Consequently, these flat lands were densely populated and the "hollers" less so. Roads are narrow and twisting and in winter often become impassable. For this reason, mountain families lived in real isolation, especially in winter. Even in ideal weather it was a two-hour drive from the southern end of the county to the northern end. One community in Mingo County, Dingess, is geographically isolated: to reach it, one must travel through a one-mile, single-lane tunnel.

Deep mining was the major industry in the area. The associated railroad industry was the next largest employer. Employment and the standard of living in the area were greatly influenced by the vicissitudes of the coal industry. When a miner was working, his standard of living was relatively high, and his family was eligible for services provided using the coal company's health card. Even so, the threat to a miner's health was ever-present. And when a miner was not working, he was without other resources. Few other sources of employment existed, and most of these were short-term.

Many young people who cannot find work in the mines or in the poverty programs (including Head Start) must leave the county. Between 1960 and 1970 there was an 18 percent decrease in the population. The County Clerk's office suggested that the "boom" in the coal industry in recent years may limit this emigration. This was evidenced by more recent information. Between 1970 and 1980 the population increased by 14 percent, a substantial change in direction from the 1960-1970 decline. Although family incomes varied greatly according to season and the status of coal mining operations, in 1970 45 percent of the population was living below 125 percent of the poverty level. The median family income in 1974 was $5,127.

Access to medical services was a problem. In 1970 there were only 31 physicians and one hospital serving the entire county. Most medical and health resources were concentrated in central locations, often difficult for the more geographically isolated families to reach. Families often had to travel 30 to 50 miles over mountain roads to obtain medical care. Specialized care requires a trip to Huntington or Charleston, each more than two hours away.

The Mingo County Head Start grantee's program began as a summer Head Start program in 1965 under the sponsorship of the Mingo County Economic Opportunity Commission. It has since become a full-year program, operating four days a week, six hours per day.

In the 1980-1981 school year, the program was funded for 300 children and served 345 children in 12 centers. Ninety-one percent of the Head Start children were white; nine percent were black. Black children were concentrated in two centers that were situated in predominantly black areas of Williamson. The 12 centers were widely dispersed throughout the county, in 11 communities. Some centers were over an hour's drive from the main Head Start offices in Williamson. Transportation for most children was provided by the program, or by a group of parent volunteers. Parent involvement and participation in Head Start activities was reportedly very high. Most problems of nonparticipation were found in the more isolated communities, where children's attendance was often problematic.

Sample Description

The design of the Head Start Health Evaluation, as shown previously in Table 1A-1 stipulated recruitment of approximately 300 Head Start-eligible children, assignment to the Head Start group or the non-Head Start group, and assignment to a condition of either pretest or no pretest. From this ideal design two samples would emerge--one containing those children who received both the pretest and the posttest of the evaluation, and a second containing those children who received the posttest only. Allowing for attrition of appriximately 50 children per site, the final samples per site were projected to be approximately 250 children. The actual attrition rates vastly exceeded those estimates.

Because of attrition we modified the evaluation design and recruited an additional group of both Head Start and non-Head Start comparison children for the posttest examination. This augmentation sample is shown in Exhibit 2C-2 at Stage IV. Hence, although the children in the longitudinal sample were randomly assigned, implementation of the evaluation design resulted in modifications to some features of that design. For example, the children in the augmentation sample were not randomly assigned because they were recruited after the Head Start treatment began.

A total of 2364 children were actually recruited for the evaluation as shown in Exhibit 2C-3. However, although many parents of these low-income and Head Start-eligible children were willing to "sign-up" for the evaluation, only thirty-five percent followed through with the parent interviews and health examinations of their children. This experience of severe attrition, depicted graphically in Table 1A-3, reflected the Head Start program's own experience with recruitment and turnover among their eligible population: Greene and Humphreys Counties generally experienced the lowest rates of attrition and turnover while St. Clair County experienced a very high rate of attrition from the program. (Although the attrition rate in Maricopa County was very high among the children recruited for the evaluation, the Head Start program's added requirement that the family provide transportation for their child greatly delimited the children who participated in the program and reduced the numbers of children lost by attrition.) Hence the evaluation team's difficulties in retaining the families who had initially agreed to participate in the Head Start Health Evaluation was very similar to that of the Head Start program in each site with respect to recruitment and attendance of the children in the program.

Such modification in the samples of children ultimately required five classifications of children to distinguish among those who remained in the study, those who dropped out, and those who were added after the pretest. These have been defined as separate samples of children in this report. Exhibit 2C-4 depicts these samples' participation in the pretest and posttest of the evaluation.

Exhibit 2C-2

Evaluation Design and Implementation Stages for Original and Augmentation Samples

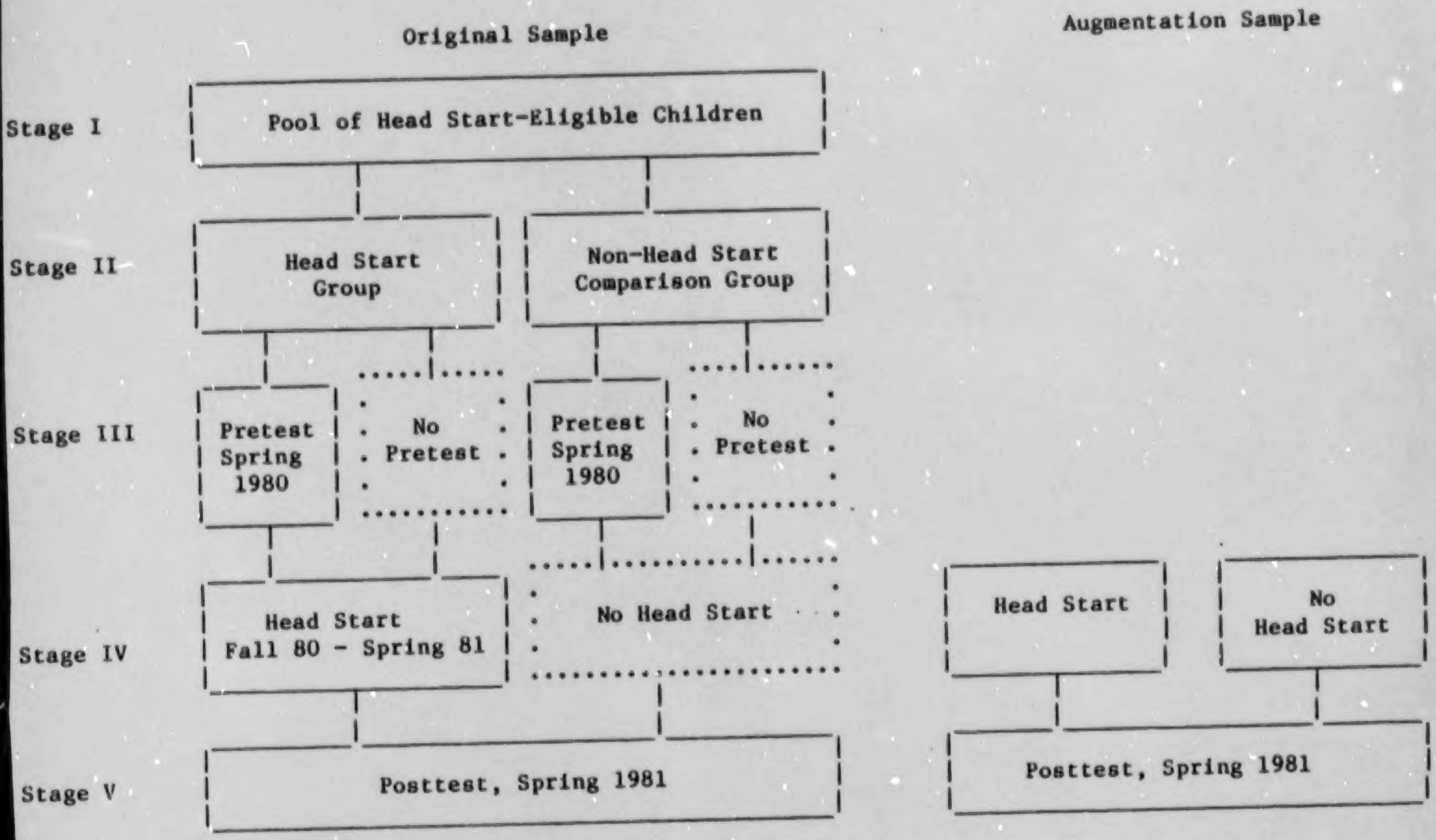
Original Sample
Augmentation Sample
Stage I
Pool of Head Start-Eligible Children
Stage II
Head Start Group
Non-Head Start Comparison Group
Stage III
Pretest Spring 1980
No Pretest
Pretest Spring 1980
No Pretest
Stage IV
Head Start Fall 80 - Spring 81
No Head Start
Head Start
No Head Start
Stage V
Posttest, Spring 1981
Posttest, Spring 1981

Exhibit 2C-3

Number of Children Recruited for the Evaluation

Sample[a]	Recruited vs. Examined		Greene & Humphreys Counties			St. Clair County			Maricopa County			Mingo County			All Sites		
	Rostered Prior to Pretest	n	267			298			353			300			1218		
		%	64.3			42.8			53.4			50.7			51.5		
	Pretested	n		95			113			95			73			376	
		%		35.6			38.0			26.9			24.3			30.9	
A	& Posttested	n			74			42			56			36			208
		%			77.9			37.2			58.9			49.3			55.3
D	& Lost by Attrition[b]	n			21			71			39			37			168
		%			22.1			62.8			41.1			50.7			44.7
	Assigned to Posttest Only	n		85			164			35			97			381	
		%		31.8			55.0			9.9			32.3			31.3	
B	& Posttested	n			56			41			11			31			139
		%			65.9			25.0			31.4			32.0			36.5
E	& Lost by Attrition[b]	n			29			123			24			66			242
		%			34.1			75.0			68.6			68.0			63.5
	Lost without Interview[b]	n		87			21			223			130			461	
		%		32.6			7.0			63.2			43.4			37.8	
	Rostered Prior to Posttest	n	148			398			308			292			1146		
		%	35.7			57.2			46.6			49.3			48.5		
C	Posttested	n			98			111			100			161			470
		%			66.2			27.8			32.5			55.1			41.0
	Lost by Attrition[b]	n			50			287			208			131			676
		%			33.8			72.2			67.5			44.9			59.0
	Total Recruited		415			690			661			592			2364		
	Total Attrition	n	187			502			494			364			1547		
		%	45.1			72.1			74.7			61.5			65.4		

[a] Key to Samples:

A	Initial recruitment sample: received both pretest and posttest (longitudinal sample).
B	Initial recruitment sample: received posttest only.
C	Augmentation sample recruited prior to posttest: received posttest only.
D	Initial recruitment/attrition sample: received pretest only.
E	Initial recruitment/attrition sample: received neither pretest nor posttest.
Others	Rostered and signed consent to participate only, never completed the family background questionnaire.

[b] Groups of children lost due to attrition.

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Exhibit 2C-4

Samples of Children Recruited for the Head Start Health Evaluation by Participation in Pretest and Posttest

Description	Pretest	Posttest
	Original Recruitment	
Pretest-Posttest Longitudinal Sample	Sample A	Sample A
Posttest-Only Sample		Sample B
Pretest-Only, Attrition Sample	Sample D	
Neither Test, Attrition Sample[a]	Sample E	Sample E
	Augmentation Recruitment	
Posttest Only, Augmentation Sample		Sample C

[a] Although the evaluation collected no health measures on children in this sample, it did conduct the parent interview on family background characteristics.

Sample A is the longitudinal sample. These children received both the pretest and posttest. In Exhibit 2C-2, these are the children who were recruited in Stage I and examined at both Stages III and V. *Sample B* is the group of children who were recruited in Stage I and assigned to participate only in the posttest at Stage V. *Sample C* is the augmentation sample which was recruited during Stage IV of the evaluation and posttested at Stage V.

Two additional samples were recruited at Stage I prior to the pretest along with Samples A and B. *Sample D* comprises those children who (with Sample A) received the pretest at Stage III and should have been part of the longitudinal sample, but were lost through attrition. The fifth classification, *Sample E* is the group of children who were recruited at Stage I and received neither the pretest nor the posttest. They were lost sometime between their recruitment and the posttest. Sample E received only the parent interview for family background characteristics.

This report treats these samples separately and in specific combinations because of varying amounts of information on the children (e.g., both pretest and posttest data for the longitudinal evaluation), and the potential for misinterpretation of findings because not all of the children were randomly assigned as follows:

- Longitudinal sample (Sample A);
- Cross-sectional pretest sample (Samples A and D);
- Cross-sectional posttest sample (Samples A, B, and C);
- Cross-sectional randomly assigned posttest sample (Samples A and B).

Exhibit 2C-5 shows the sample sizes of children for each of the sites in the Head Start Health Evaluation and for each of the specified samples. The column percentages indicate, within each site, the contribution of each sample from A to E to the total sample size. This exhibit demonstrates that rates of attrition (Samples D and E) varied considerably among the sites: 50 percent in St. Clair County, 31 percent in Mingo County, 27 percent in Maricopa County, and 18 percent in Greene and Humphreys Counties. In all sites except St. Clair County, Sample C amply replaced the children lost from the study through attrition.

Exhibit 2C-5

Number of Children in Evaluation by Sample and Site

Sample		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All
A	n	74	42	56	36	208
	%	26.6	10.8	24.3	10.9	17.0
B	n	56	41	11	31	139
	%	20.1	10.6	4.8	9.4	11.3
C	n	98	111	100	161	470
	%	35.3	28.6	43.5	48.6	38.3
D	n	21	71	39	37	168
	%	7.6	18.3	17.0	11.2	13.7
E	n	29	123	24	66	242
	%	10.4	31.7	10.4	19.9	19.7
TOTAL		278	388	230	331	1227

As mentioned previously in Technical Appendix 2A, various difficulties in maintaining the original random assignment occurred. For example, the Head Start program inadvertently recruited from the non-Head Start sample and some children who were assigned to the Head Start group refused to "go to school." Exhibit 2C-6 shows the shifts which occurred in Samples A and B.

Because of the substantial changes in the original sample from attrition and augmentation, the evaluation conducted an extensive investigation of the possible implications of these sample changes. These investigations occurred at two points in time, in the fall after the Head Start children entered the program and after the posttest data collection as part of the analysis. In general, the first investigation indicated that minor differences existed between the Head Start and non-Head Start samples, but none were statistically significant. The more intensive investigation after the posttest produced a similar result; no consistent statistically significant differences among the samples in either their health or personal characteristics.

Exhibit 2C-6

Number of Children Assigned to Head Start and Non-Head Start Groups by Sample with Numbers of Children Who Switched Group After Random Assignment to Samples A and B

Sample	Posttest Children (Samples A,B,C) in:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS	NHS	HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A										
Original	38	36	29	13	31	25	22	14	120	88
HS -> NHS	-4	4	-7	---> 7	-5	5	-5	---> 5	-21	21
HS <- NHS	9	<--- -9	3	-3	14	<--- -14	1	-1	27	<--- -27
Final	43	31	25	17	40	16	18	18	126	82
Sample B										
Original	30[a]	26[a]	21	20	2	9	9	22[b]	62	77
HS -> NHS	-8	8	-13	---> 13	-1	1	-3	3	-25	25
HS <- NHS	12	<--- -12	4	-4	9	<--- -9	11	<--- -11	36	<--- -36
Final	34	22	12	29	10	1	17	14	73	66
Sample C	50	48	71	40	56	44	84	77	261	209
Sample D	9	12	36	35	22	17	22	15	89	79
Sample E	12	17	63	60	9	15	33	33	117	125
Sample A,B,C	127	101	108	86	106	61	119	109	460	357
Sample A,B,D,E	98	82	136	141	81	49	90	80	405	352

[a] One case does not have Pretest Parent Interview

[b] Four cases do not have Pretest Parent Interview

Effects of Augmentation and Attrition

Demographic Differences. In general, after analyses to examine differences among the total samples and between the Head Start and non-Head Start children within samples, the results of these analyses, summarized in Exhibits 2C-7 through 2C-10 indicate that there are significant differences which needed to be checked against all dependent measures and used as covariates in the analysis, if necessary. Importantly, none of the analyses indicated that the augmentation sample was ever different from all of the randomly assigned samples, despite fluctuations among them. (Tables 2C-1 through 2C-4 present detailed results of these tests of sample differences.)

Differences in Health Characteristics. Since the attrition and augmentation of the samples could affect the health characteristics, we examined those of the two pretested samples (A and D) and the longitudinal versus the augmentation sample (A and C). As shown in Tables 2C-5 and 2C-6, there were no differences in the health characteristics of these groups of children.

On the basis of these analyses, there was no reason to decide that changes in the original samples altered the health characteristics of the children in the evaluation. Moreover, the demographic differences existing between the two samples of Head Start and non-Head Start samples varied among sites and were therefore likely to be needed in some sites and not others, or among sites but not within sites.

Children in Most Need. Various groups of children (who because of low per capita income, low mother's education or age, lack of medical insurance or Medicaid, lack of benefits from WIC or Food Stamps, and difficulty of access to medical services) were considered at risk in terms of demographic characteristics. The evaluation examined the possibility that Head Start was targeting these children for services. The results, summarized in Exhibit 2C-11 indicate that Head Start children in Maricopa County receive services regardless of special need. No special group of children were more or less likely to receive services. Children without medical insurance or Medicaid were more likely to receive vision and hearing screens (in Greene and Humphreys Counties and St. Clair County) but less likely to receive dental treatments (in St. Clair County). Children in Mingo County who were not receiving Food Stamps or WIC were less likely to receive hearing and

Exhibit 2C-7

Summary of Significant Comparisons of the Demographic Characteristics of Samples A, B, C, D, E on Continuous Measures for the Total Samples of Children in Each Site[a]

Demographic Characteristics	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	Different Samples	Sig.	Different Samples	Sig.	Different Samples	Sig.	Different Samples	Sig.	Different Samples	Sig.
Family Income			D vs. C	*			E, D vs. B, C	***	E, D, A vs. C	***
Per Capita Income			D vs. C	*			E, D vs. A, B, C	***		
Household Size					C vs. D	*				
Years at Current Address			D vs. B, A	***			C vs. B	*	D vs. B	***
Child's Age			C, B, A vs. D, E	***					B, C, A, vs. D, E	***
Mother's Age at Birth of Child										
Mother's Education			D vs. A, E, C, B	**	E, D vs. C, B	**	E, D vs. C, B	***	D vs. A, E, C, B	**

[a] Significance indicated as:
*p < .05
**p < .01
***p < .001

Exhibit 2C-8

Summary of Significant Comparisons of the Demographic Characteristics of Samples A, B, C, D, E on Categorical Measures for the Total Samples of Children in Each Site

Demographic Characteristics	Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
	Chi-squared Significance	Chi-squared Significance	Chi-squared Significance	Chi-squared Significance	Chi-squared Significance
Previous Head Start Experience				**	***
Two-Parent Family		*			***
Sex of Child					
Prior Day Care Experience of Child		***			***
Medical Insurance		**			***
Dental Insurance		***			***
Anyone in household employed		**			**
Unemployment Benefits					
Welfare Benefits		**		*	***
Birth Order					
Ethnicity					***
Participation in a Food Assistance Program					**

*p < .05
**p < .01
***p < .001

Exhibit 2C-9

Summary of Significant Comparisons of the Demographic Characteristics for Head Start and Non-Head Start Children Within Samples A, B, C, D, E on Continuous Measures[a]

Demographic Characteristics	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Sample	Sig.	Sample	Sig.	Sample	Sig.	Sample	Sig.
Family Income			D	+			C	---
Per Capita Income							C	---
Household Size			D	+			A C	+ +
Years at Address								
Child's Age	C	+++	C	+			C	+++
Mom's Age								
Mother's Education	E	—	B	+				

[a] Significance indicated (+ for Head Start higher and - for non-Head Start higher) as:

+ p < .05
++ p < .01
+++ p < .001

Exhibit 2C-10

Summary of Significant Comparisons of the Demographic Characteristics for Head Start and Non-Head Start Children within Samples A, B, C, D, E on Categorical Measures[a]

Demographic Characteristics	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Sample	Sig.	Sample	Sig.	Sample	Sig.	Sample	Sig.
Previous Head Start Experience			C	*			C	**
Two Parent Family					C	*		
Sex of Child	E	*			C D	***		
Medical Insurance			C D	*** *	E	**		
Dental Insurance			C	*	D	*		
Anyone in household employed	C	**					D	*
Unemployed Benefits	A B	* *						
Welfare Benefits	C	*					C	***
Birth Order								
Ethnicity	B	*			C	*		
Participation in a food assistance program			C	***				

[a] Significance indicated (+ for Head Start higher and - for non-Head Start higher) as:

* $p < .05$

** $p < .01$

*** $p < .001$

Exhibit 2C-11

Special Groups of Children Who Were More (or Less) Likely to Receive Head Start Services

Head Start Services		Posttested Head Start Children (Samples A, B, C) in:			
		Greene/Humphreys Counties	St. Clair County	Maricopa County	Mingo County
Medical	More Screens				
	Fewer Findings				
	More Treatment				
	Fewer Screens				
	More Findings	<12 yrs. educ.			
	Fewer Treatment				
Dental	More Screens				
	Fewer Findings				<12 yrs. educ.
	More Treatment				
	Fewer Screens		<$1295 per capita		
	More Findings				
	Fewer Treatment	Teenaged mothers; Difficult access	No medical insurance; No Medicaid		
Vision	More Screens	No medical insurance; No Medicaid	No medical insurance; No Medicaid		
	Fewer Findings				
	More Treatment				
	Fewer Screens	<12 yrs. educ.			
	More Findings				
	Fewer Treatment				
Hearing	More Screens	No medical insurance	No medical insurance; No Medicaid		<$1295 per capita
	Fewer Findings				
	More Treatment				
	Fewer Screens	Teenaged mothers			No WIC or Food Stamps
	More Findings				
	Fewer Treatment				
Hematology	More Screens	No Medicaid			
	Fewer Findings				No WIC or Food Stamps
	More Treatment				
	Fewer Screens				
	More Findings				
	Fewer Treatment				

hematology screens. Hence, overall, it does not appear that Head Start made health screening and delivery decisions based on whether or not the child was a member of the above special groups.

Children with One or More Health Problems

Another way to examine the impact of Head Start on the children "most in need" is to look at those with the most health problems in various health domains (e.g., speech, hearing, and hematology) according to the Head Start health records, to determine whether children with multiple problems were more likely than children with single problems to be treated. According to information in Exhibit 2C-12, only in St. Clair County were children with multiple problems significantly more likely to receive treatment for those

Exhibit 2C-12

Proportion of Problems Treated According to Pretest Evaluation Findings for Head Start Children[a]

Number of Problems Per Child		Longitudinal Head Start Children (Sample A) in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
One Problem	n	43	34	37	45	59
	Mean	.33	.18	.57	.27	.33
	St. Dev.	.47	.39	.50	.45	.47
Two or More Problems	n	49	43	50	53	195
	Mean	.26	.33[a]	.56	.42	.39
	St. Dev.	.25	.22	.28	.30	.29

[a] Average of each child's number of domains with problems divided by the number of domains with treatment.

[b] Statistically significant at $p \leq .05$

problems than if they had a single problem. (There was a similar, but not significant trend in Mingo County.)

Children with Health Problems at Posttest

At posttest, the Head Start children who had health problems in a particular domain were also examined to determine whether Head Start had screened them at a higher rate than children with no problems. As shown in Exhibit 2C-13, children in Maricopa County with language problems were more likely to be screened. A similar trend (though not statistically significant) occurred for children with language problems in Mingo County and overall for children with vision problems. Hence, it appeared that children with chronic vision and language problems were more likely to be screened by Head Start. Other health problems were not treated similarly.

Exhibit 2C-13

Percent of Head Start Children with Findings from Evaluation According to Whether or Not They Received Head Start Screens[a]

Head Start Health Evaluation Findings		Posttested Children (Samples A,B,C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Screened	Not Screened	Screened	Not Screened	Screened	Not Screened	Screened	Not Screened	Screened	Not Screened
Medical Examination	n	53/ 94	18/ 33	43/102	2/ 6	46/102	0/ 0	28/ 83	8/ 29	170/381	28/ 68
	%	56.4	54.5	42.2	33.3	41.1	0.0	33.7	41.2	44.6	41.2
Dental Evaluation (Urgents and decay)	n	80/ 84	40/ 43	59/102	6/ 6	52/102	0/ 0	56/ 73	21/ 39	247/361	67/ 88
	%	95.2	9.30	57.8	100.0*	51.0		76.7	53.8*	68.4	76.1
Dental Evaluation (Urgents)	n	9/ 84	2/ 43	10/102	0/ 6	10/102	0/ 0	18/ 71	6/ 39	47/359	8/ 88
	%	10.7	4.7	9.8	0.0	9.8		25.4	15.4	13.1	9.1
Vision Examination	n	5/ 52	2/ 75	2/ 50	5/ 56	16/101	0/ 1	3/ 36	5/ 76	26/239	12/208
	%	9.6	2.7	4.0	8.7	15.8	0.0	8.3	6.6	10.9	5.8
Hearing Examination	n	3/ 45	10/ 80	3/ 45	11/ 61	13/100	0/ 1	16/ 84	7/ 28	35/274	28/170
	%	6.7	12.5	6.7	18.0	13.0	0.0	19.0	25.0	12.8	16.5
Speech and Language Evaluation	n	21/ 50	34/ 77	34/ 70	18/ 38	9/ 14	17/67	2/ 3	56/109	66/137	125/291
	%	42.0	44.2	48.6	47.4	64.3	25.4*	66.7	51.4	48.2	43.0
Speech Evaluation	n	16/ 49	22/ 73	22/ 70	14/ 38	5/ 14	12/ 64	1/ 2	43/103	44/135	91/278
	%	32.7	30.1	31.4	36.8	35.7	18.8	50.0	41.7	32.6	32.7
Language Evaluation	n	13/ 50	19/ 77	21/ 70	11/ 38	7/ 14	9/ 67	2/ 3	22/109	43/137	61/291
	%	26.0	24.7	30.0	28.9	50.0	13.4*	66.7	20.2	31.4	21.0*

[a] Significance $p < .05$ indicated as *.

Table 2C-1

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
FAMILY INCOME ($)												
Sample A	72	4694.44	4572.23	41	5445.12	3256.01	53	6481.13	5385.13	33	6295.45	4741.96
Sample B	53	5433.96	5478.58	37	4547.30	2784.40	10	7675.00	4686.05	28	7571.43	5557.30
Sample C	97	4113.40	3367.86	101	6042.05	3976.03	100	7002.50	5472.55	156	8491.99	5816.44
Sample D	21	4964.29	4486.03	69	4409.42	1756.28	39	6784.46	4859.04	37	4425.67	2038.57
Sample E	29	4732.76	3655.92	120	5204.58	3723.48	24	5145.83	2877.87	64	4062.50	1897.16
		F= 0.85	P= 0.492		F= 2.89	P= 0.022		F= 0.76	P= 0.551		F= 12.65	P= 0.000
PER CAPITA INCOME ($)												
Sample A	71	942.35	1096.54	41	1029.19	641.10	53	1160.07	786.30	33	1413.33	1391.99
Sample B	52	1125.68	1122.03	36	952.08	671.60	10	1403.75	1076.34	28	1728.31	1372.34
Sample C	97	839.18	692.44	100	1267.27	994.98	100	1467.86	1517.07	156	1879.62	1397.58
Sample D	21	927.49	973.43	69	884.84	313.73	39	1051.16	656.44	37	965.80	421.49
Sample E	29	1016.08	1068.34	120	1071.48	858.39	24	978.51	486.35	64	936.89	399.55
		F= 0.79	P= 0.531		F= 2.74	P= 0.028		F= 1.63	P= 0.167		F= 9.94	P= 0.000
HOUSEHOLD SIZE												
Sample A	73	5.70	2.76	42	6.10	2.99	56	5.61	2.01	35	4.89	1.57
Sample B	55	5.60	2.61	39	5.67	2.45	11	5.82	1.78	31	4.74	1.59
Sample C	98	5.60	2.29	109	5.33	2.10	100	5.30	1.80	161	4.94	2.01
Sample D	21	6.05	2.58	70	5.44	2.31	39	6.46	1.96	37	4.78	1.58
Sample E	29	6.41	3.83	123	5.72	2.53	24	5.71	2.25	66	4.64	2.16
		F= 0.63	P= 0.[illegible]44		F= 0.93	P= 0.447		F= 2.48	P= 0.045		F= 0.32	P= 0.862

Table 2C-1 (continued)

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
CHILD'S AGE												
Sample A	74	4.29	0.54	42	4.43	0.68	56	5.09	0.25	36	4.30	0.58
Sample B	56	4.33	0.62	41	4.24	0.50	11	5.01	0.27	31	4.32	0.59
Sample C	98	4.33	0.95	111	4.20	0.67	100	5.05	0.31	161	4.21	0.78
Sample D	21	4.57	0.61	70	4.80	0.85	39	4.99	0.30	37	4.33	0.75
Sample E	29	4.51	0.80	123	4.97	0.93	24	5.02	0.32	66	4.37	0.61
	F= 0.95	P= 0.437		F= 17.55	P= 0.000		F= 0.86	P= 0.485		F= 0.78	P= 0.535	
MOTHER'S AGE AT BIRTH OF CHILD												
Sample A	73	21.97	5.64	40	20.76	4.43	56	23.57	6.14	35	23.31	5.43
Sample B	56	24.01	6.30	38	22.01	7.59	10	23.01	6.00	30	24.74	5.96
Sample C	95	23.38	6.15	107	22.63	5.50	100	23.96	5.49	156	23.91	5.59
Sample D	19	20.45	4.29	69	21.20	3.52	38	24.89	6.94	37	23.66	6.40
Sample E	26	24.58	7.90	119	21.97	5.88	22	21.76	3.46	63	22.58	5.48
	F= 2.24	P= 0.065		F= 1.20	P= 0.310		F= 1.08	P= 0.366		F= 0.95	P= 0.433	
MOTHER'S EDUCATION (YEARS)												
Sample A	74	10.77	2.73	42	11.26	1.86	56	9.38	2.78	36	9.94	2.08
Sample B	56	11.23	2.46	40	11.60	1.68	11	8.00	2.24	31	10.87	1.93
Sample C	98	10.42	2.20	110	11.51	1.75	99	10.37	2.71	161	10.61	2.24
Sample D	21	10.95	2.29	70	10.56	1.51	39	8.28	4.23	37	9.41	2.73
Sample E	29	10.41	2.24	121	11.26	1.94	24	9.38	2.14	66	9.29	1.99
	F= 1.18	P= 0.318		F= 3.62	P= 0.007		F= 4.49	P= 0.002		F= 6.18	P= 0.000	

Table 2C-1 (continued)

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
YEARS AT CURRENT ADDRESS												
Sample A	73	6.94	8.58	42	6.92	9.15	55	4.36	7.65	34	6.45	7.05
Sample B	56	8.77	10.08	41	5.41	4.97	11	5.20	4.62	29	9.42	13.38
Sample C	94	7.19	7.89	110	4.09	4.47	100	3.70	4.15	147	5.07	5.26
Sample D	21	6.23	7.28	70	2.63	4.43	39	3.19	3.78	37	5.08	6.94
Sample E	29	10.70	16.19	123	3.42	4.72	24	1.93	4.19	66	5.78	7.06
	F= 1.16	P= 0.326		F= 5.45	P= 0.000		F= 1.25	P= 0.292		F= 2.42	P= 0.049	

Table 2C-2

FAMILY INCOME FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	41	1250	3750	8250	5134	4240	31	1750	2250	4750	4113	4989	0.92	0.363
Sample B	31	1250	3750	6750	4661	4517	22	1250	4250	10500	6523	6561	-1.15	0.258
Sample C	49	2250	3250	5250	4138	3433	48	1250	3750	5250	4088	3336	0.07	0.943
Sample D	9	3750	4250	5750	5472	4617	12	1500	2500	6500	4583	4569	0.44	0.667
Sample E	12	2750	3750	6000	5375	4457	17	2250	4250	6250	4279	3034	0.74	0.469
St.Clair														
Sample A	25	3250	4250	5750	4930	2211	16	3250	4500	9375	6250	4395	-1.11	0.278
Sample B	10	3250	3250	4250	3925	2500	27	3250	4250	4500	4778	2893	-0.88	0.389
Sample C	67	3250	4750	6250	6123	4285	34	3250	4750	7250	5882	3338	0.31	0.757
Sample D	35	3500	4750	5250	4836	1857	34	3250	3750	4750	3971	1553	2.10	0.039
Sample E	61	3250	4250	5750	5656	4664	59	3250	3750	6250	4738	2346	1.37	0.174
Maricopa														
Sample A	37	3250	4750	8250	6838	5808	16	2500	3750	9375	5656	4304	0.82	0.417
Sample B	9	4750	7250	10500	8278	4541	1	----	2250	----	2250	----	3.98	0.004
Sample C	56	2250	6750	10500	7696	6652	44	3000	6250	9375	6119	3307	1.55	0.125
Sample D	22	3250	6000	8250	6750	5085	17	3250	5750	9750	6838	4705	-0.06	0.956
Sample E	9	2750	4250	6250	5139	3008	15	2750	4750	7000	5150	2904	-0.01	0.993
Mingo														
Sample A	17	2250	6250	8250	6515	4911	16	3250	4250	8250	6062	4705	0.27	0.789
Sample B	14	3250	5250	7250	5893	3224	14	4750	8250	13500	9250	6905	-1.65	0.117
Sample C	81	2750	4750	10500	6768	5080	75	6000	8250	13500	10353	6017	-4.00	0.000
Sample D	22	2750	4500	6250	4386	1995	15	3250	4750	6250	4483	2170	-0.14	0.891
Sample E	33	2750	3250	5750	3962	1728	31	2500	3750	5250	4169	2086	-0.43	0.668

Table 2C-2 (continued)

PER CAPITA INCOME FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	41	312	562	1500	962	982	30	250	562	1125	916	1253	0.17	0.869
Sample B	31	312	417	1688	1026	1133	21	188	1250	2100	1272	1116	-0.77	0.443
Sample C	49	375	708	1150	850	675	48	250	672	1198	829	717	0.15	0.883
Sample D	9	523	536	1062	1080	1240	12	229	500	1397	813	756	0.57	0.578
Sample E	12	306	574	2438	1258	1373	17	250	688	1050	845	791	0.94	0.362
St.Clair														
Sample A	25	575	1050	1062	894	372	16	650	1073	1312	1240	893	-1.47	0.159
Sample B	10	607	1073	1083	947	528	26	458	800	1062	954	729	-0.03	0.977
Sample C	66	792	950	1083	1234	1059	34	844	1083	1583	1332	869	-0.50	0.621
Sample D	35	729	875	950	861	305	34	812	938	1083	909	325	-0.64	0.527
Sample E	61	688	875	964	1139	1031	59	594	812	1083	1001	634	0.89	0.378
Maricopa														
Sample A	37	688	1050	1438	1140	670	16	562	812	1438	1208	1030	-0.24	0.810
Sample B	9	906	1375	1750	1497	1098	1	----	562	----	562	----	2.55	0.034
Sample C	56	583	1094	1750	1572	1908	44	831	1229	1781	1336	781	0.84	0.404
Sample D	22	562	970	1375	1093	749	17	650	850	1375	996	530	0.47	0.639
Sample E	9	850	917	1125	1050	347	15	556	958	1281	936	561	0.61	0.545
Mingo														
Sample A	17	750	950	1562	1309	1227	16	638	1073	1650	1524	1582	-0.43	0.667
Sample B	14	950	1135	1650	1302	566	14	1031	1667	2700	2154	1789	-1.70	0.108
Sample C	81	675	1083	1750	1346	940	75	1164	2375	3438	2456	1577	-5.28	0.000
Sample D	22	750	944	1188	991	386	15	615	812	1269	930	480	0.41	0.685
Sample E	33	583	812	1179	902	400	31	672	875	1250	974	402	-0.71	0.479

Table 2C-2 (continued)

HOUSEHOLD SIZE FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	43	4.00	5.00	7.00	6.12	3.22	30	4.00	5.00	6.00	5.10	1.81	1.72	0.091
Sample B	34	4.00	5.00	7.00	5.44	2.45	21	4.00	5.00	8.00	5.86	2.90	-0.55	0.588
Sample C	50	4.00	5.00	6.00	5.28	1.95	48	4.00	5.00	8.00	5.94	2.57	-1.42	0.158
Sample D	9	4.00	5.00	9.00	6.33	3.28	12	4.00	6.00	7.50	5.83	2.04	0.40	0.694
Sample E	12	4.00	5.50	10.00	7.42	4.66	17	4.00	5.00	6.00	5.71	3.08	1.11	0.281
St.Clair														
Sample A	25	4.00	5.00	10.00	6.48	3.42	17	4.00	5.00	6.00	5.53	2.18	1.10	0.278
Sample B	12	3.00	4.50	7.00	5.00	2.00	27	4.00	5.00	8.50	5.96	2.61	-1.26	0.219
Sample C	70	4.00	5.00	7.00	5.30	1.72	39	3.50	5.00	6.00	5.38	2.66	-0.18	0.859
Sample D	36	4.00	5.50	6.50	6.06	2.41	34	4.00	4.00	5.00	4.79	2.03	2.37	0.021
Sample E	63	4.00	5.00	7.00	5.79	2.50	60	4.00	5.00	7.00	5.63	2.57	0.35	0.727
Maricopa														
Sample A	40	4.00	6.00	7.00	5.85	2.15	16	4.00	4.00	6.00	5.00	1.46	1.70	0.096
Sample B	10	5.00	5.50	8.00	6.00	1.76	1	----	4.00	----	4.00	----	3.59	0.006
Sample C	56	4.00	5.00	7.00	5.59	2.03	44	4.00	5.00	6.00	4.93	1.65	1.79	0.077
Sample D	22	5.00	6.00	7.00	6.41	2.17	17	5.00	6.00	7.00	6.53	1.70	-0.19	0.847
Sample E	9	3.00	5.00	6.00	4.89	2.20	15	4.50	6.00	7.00	6.20	2.21	-1.41	0.177
Mingo														
Sample A	18	4.00	5.00	7.00	5.39	1.79	17	4.00	4.00	5.00	4.35	1.11	2.07	0.047
Sample B	17	4.00	5.00	5.00	4.53	1.18	14	3.00	5.00	6.00	5.00	2.00	-0.78	0.447
Sample C	84	4.00	4.50	6.00	5.25	2.33	77	4.00	4.00	5.00	4.60	1.53	2.12	0.036
Sample D	22	4.00	4.00	5.00	4.41	1.05	15	4.00	5.00	6.00	5.33	2.06	-1.60	0.126
Sample E	33	3.00	4.00	6.00	4.70	1.81	33	3.00	4.00	5.00	4.58	2.49	0.23	0.822

Table 2C-2 (continued)

CHILD'S AGE FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	43	3.98	4.31	4.79	4.37	0.61	31	3.81	4.17	4.41	4.17	0.40	1.77	0.081
Sample B	34	3.79	4.26	4.53	4.31	0.64	22	4.06	4.28	4.41	4.36	0.60	-0.27	0.790
Sample C	50	3.86	4.48	5.31	4.68	0.88	48	3.40	3.56	4.22	3.96	0.88	4.03	0.000
Sample D	9	4.24	4.28	4.50	4.48	0.52	12	4.28	4.53	4.94	4.64	0.68	-0.61	0.550
Sample E	12	3.77	4.15	4.73	4.36	0.69	17	4.00	4.31	5.22	4.62	0.88	-0.89	0.383
St.Clair														
Sample A	25	3.94	4.25	4.83	4.42	0.64	17	4.04	4.43	4.77	4.45	0.75	-0.16	0.871
Sample B	12	3.99	4.31	4.75	4.37	0.52	29	3.78	4.22	4.44	4.19	0.62	0.97	0.342
Sample C	71	3.85	4.31	4.82	4.32	0.60	40	3.46	3.92	4.43	3.98	0.73	2.46	0.016
Sample D	36	4.11	4.71	5.48	4.78	0.89	34	4.16	4.89	5.44	4.82	0.84	-0.20	0.840
Sample E	63	4.15	4.83	5.51	4.88	0.94	60	4.33	5.00	5.80	5.05	0.92	-1.00	0.321
Maricopa														
Sample A	40	4.82	5.06	5.30	5.06	0.25	16	5.11	5.21	5.35	5.17	0.24	-1.55	0.133
Sample B	10	4.81	4.96	5.24	5.02	0.28	1	----	4.92	----	4.92	----	1.03	0.329
Sample C	56	4.81	5.10	5.29	5.06	0.30	44	4.80	5.07	5.23	5.04	0.31	0.37	0.710
Sample D	22	4.72	4.97	5.19	4.99	0.27	17	4.78	4.97	5.17	4.99	0.34	0.02	0.981
Sample E	9	4.72	5.29	5.38	5.12	0.34	15	4.67	4.97	5.21	4.96	0.31	1.19	0.251
Mingo														
Sample A	18	4.01	4.28	4.71	4.33	0.48	18	3.75	4.21	4.58	4.27	0.67	0.33	0.744
Sample B	17	3.91	4.41	4.62	4.31	0.62	14	3.88	4.34	4.71	4.33	0.58	-0.05	0.961
Sample C	84	4.00	4.59	5.16	4.52	0.70	77	3.38	3.77	4.39	3.87	0.72	5.75	0.000
Sample D	22	3.77	4.26	4.87	4.31	0.75	15	3.75	4.25	4.76	4.36	0.78	-0.20	0.841
Sample E	33	3.83	4.49	4.85	4.33	0.62	33	4.05	4.35	5.02	4.42	0.60	-0.57	0.569

Table 2C-2 (continued)

MOTHER'S AGE AT BIRTH OF CHILD FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	43	17.81	21.26	24.93	22.23	5.74	30	17.56	20.49	23.32	21.60	5.56	0.47	0.637
Sample B	34	18.13	21.41	28.57	23.63	6.79	22	19.14	25.61	29.03	24.61	5.57	-0.59	0.559
Sample C	48	20.53	22.81	25.65	24.35	6.05	47	18.63	20.77	24.81	22.39	6.15	1.56	0.121
Sample D	7	16.84	19.20	20.63	19.14	2.87	12	17.78	20.39	22.95	21.21	4.89	-1.16	0.262
Sample E	10	17.93	21.36	29.99	24.03	7.67	16	19.74	21.55	26.59	24.91	8.27	-0.28	0.786
St.Clair														
Sample A	24	18.06	20.15	23.78	21.06	4.48	16	17.09	18.85	22.34	20.29	4.46	0.53	0.597
Sample B	12	17.10	18.93	22.55	19.99	3.80	26	18.38	19.57	21.09	22.93	8.72	-1.45	0.156
Sample C	68	18.53	21.38	25.05	22.57	5.67	39	18.55	21.65	26.57	22.74	5.25	-0.16	0.876
Sample D	35	17.89	20.30	22.68	20.43	3.10	34	19.60	21.19	24.33	22.00	3.79	-1.89	0.064
Sample E	63	18.28	20.91	24.81	22.00	5.57	56	17.78	20.79	23.63	21.94	6.27	0.05	0.958
Maricopa														
Sample A	40	19.27	23.84	28.43	24.40	6.23	16	18.41	21.15	22.58	21.48	5.53	1.72	0.096
Sample B	9	19.13	23.15	29.53	23.79	5.80	1	----	15.96	----	15.96	----	4.05	0.004
Sample C	56	19.47	23.28	26.30	23.81	5.48	44	19.65	23.61	27.31	24.15	5.56	-0.31	0.758
Sample D	21	20.00	21.23	27.30	24.93	7.39	17	21.00	24.00	26.51	24.84	6.56	0.04	0.968
Sample E	8	18.38	19.91	21.57	19.91	2.69	14	19.61	22.68	24.93	22.81	4.99	-1.77	0.092
Mingo														
Sample A	18	18.42	21.22	24.11	22.12	4.31	17	18.95	23.16	27.85	24.57	6.30	-1.34	0.192
Sample B	16	20.80	21.90	28.41	23.85	4.80	14	19.52	26.89	28.62	25.76	6.35	-0.92	0.368
Sample C	81	19.50	22.13	26.92	23.79	5.84	75	19.94	22.73	27.22	24.03	5.34	-0.27	0.786
Sample D	22	19.72	21.80	26.33	23.52	5.56	15	18.59	20.17	29.63	23.85	7.67	-0.14	0.889
Sample E	31	18.63	21.73	27.79	23.65	6.09	32	18.62	20.21	23.25	21.55	4.68	1.53	0.133

Table 2C-2 (continued)

YEARS OF MOTHER'S EDUCATION FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	43	10.00	11.00	12.00	11.05	2.36	31	9.00	11.00	12.00	10.39	3.17	0.98	0.332
Sample B	34	10.00	12.00	12.00	11.56	2.49	22	9.00	11.00	12.00	10.73	2.39	1.25	0.218
Sample C	50	9.00	11.50	12.00	10.68	1.94	48	9.00	11.00	12.00	10.15	2.43	1.20	0.234
Sample D	9	10.00	11.00	12.00	11.22	2.28	12	9.50	11.00	12.00	10.75	2.38	0.46	0.650
Sample E	12	7.50	9.00	10.50	9.00	2.30	17	11.00	12.00	12.00	11.41	1.62	-3.13	0.006
St.Clair														
Sample A	25	10.00	12.00	12.00	11.16	2.12	17	11.00	12.00	12.00	11.41	1.46	-0.46	0.651
Sample B	12	12.00	12.00	12.50	12.25	0.96	28	11.00	12.00	12.00	11.32	1.85	2.08	0.045
Sample C	71	11.00	12.00	12.00	11.51	1.80	39	10.50	12.00	12.00	11.51	1.68	-0.02	0.987
Sample D	36	9.50	11.00	11.00	10.33	1.62	34	10.00	11.00	11.00	10.79	1.37	-1.29	0.202
Sample E	62	10.00	12.00	12.00	11.18	1.89	59	11.00	12.00	12.00	11.36	1.91	-0.50	0.615
Maricopa														
Sample A	40	8.00	11.00	12.00	9.75	2.95	16	8.00	8.00	10.00	8.44	2.10	1.87	0.069
Sample B	10	7.00	8.00	10.00	8.20	2.25	1	----	6.00	----	6.00	----	3.09	0.013
Sample C	56	8.00	11.00	12.00	10.59	2.14	43	8.00	12.00	12.00	10.09	3.32	0.85	0.396
Sample D	22	6.00	8.00	12.00	8.45	4.16	17	4.00	8.00	11.00	8.06	4.44	0.28	0.778
Sample E	9	8.00	10.00	11.00	9.44	2.19	15	8.00	9.00	10.50	9.33	2.19	0.12	0.906
Mingo														
Sample A	18	9.00	10.00	12.00	10.44	1.54	18	7.00	9.00	12.00	9.44	2.45	1.46	0.154
Sample B	17	11.00	12.00	12.00	11.18	2.07	14	9.00	11.50	12.00	10.50	1.74	0.99	0.331
Sample C	84	8.50	11.00	12.00	10.33	2.38	77	9.00	12.00	12.00	10.91	2.06	-1.64	0.102
Sample D	22	8.00	10.00	12.00	10.09	2.16	15	7.00	8.00	11.00	8.40	3.22	1.78	0.089
Sample E	33	7.00	9.00	10.00	9.06	2.18	33	8.00	9.00	11.00	9.52	1.79	-0.93	0.358

Table 2C-2 (continued)

YEARS AT CURRENT ADDRESS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	43	1.75	4.01	10.00	6.36	6.68	30	1.00	3.00	8.00	7.77	10.80	-0.64	0.526
Sample B	34	2.00	4.08	9.00	7.47	8.85	22	3.00	6.00	13.00	10.77	11.70	-1.13	0.265
Sample C	48	2.00	4.66	9.00	7.64	8.62	46	2.00	3.00	10.00	6.71	7.12	0.57	0.569
Sample D	9	5.00	5.00	9.00	8.67	8.06	12	0.75	1.91	5.50	4.41	6.38	1.31	0.211
Sample E	12	1.00	3.08	5.50	9.29	15.90	17	1.33	2.00	12.00	11.69	16.80	-0.39	0.699
St.Clair														
Sample A	25	3.00	4.00	8.00	7.19	10.50	17	2.00	3.92	8.00	6.52	7.00	0.25	0.804
Sample B	12	3.16	4.54	10.13	6.74	5.44	29	1.50	2.50	7.33	4.87	4.76	1.04	0.313
Sample C	71	1.00	3.00	6.00	4.61	4.92	39	0.75	2.00	4.08	3.13	3.37	1.87	0.064
Sample D	36	0.63	1.29	3.16	3.61	5.74	34	0.42	1.00	2.00	1.60	1.99	1.98	0.054
Sample E	63	0.33	1.50	3.66	3.19	4.71	60	0.50	2.17	4.58	3.66	4.77	-0.55	0.584
Maricopa														
Sample A	40	0.79	2.00	4.00	4.83	8.45	15	0.29	2.00	3.00	3.11	4.96	0.93	0.357
Sample B	10	2.00	3.00	8.00	5.52	4.74	1	----	2.00	----	2.00	----	2.35	0.043
Sample C	56	1.00	2.00	6.50	4.36	4.98	44	0.63	2.50	4.50	2.87	2.57	1.94	0.056
Sample D	22	0.50	1.08	3.00	2.58	3.35	17	0.58	2.50	8.00	3.95	4.25	-1.08	0.288
Sample E	9	0.25	0.50	1.00	0.93	1.24	15	0.17	0.33	2.71	2.53	5.19	-1.14	0.270
Mingo														
Sample A	17	1.00	2.00	10.00	6.44	7.01	17	2.00	3.50	7.00	6.47	7.31	-0.01	0.992
Sample B	15	2.25	5.00	9.50	10.62	15.60	14	2.00	4.00	12.00	8.14	11.00	0.50	0.623
Sample C	79	1.13	3.00	6.00	4.79	5.06	68	1.25	4.00	7.00	5.40	5.50	-0.69	0.493
Sample D	22	1.17	1.75	3.50	4.50	6.68	15	0.75	1.42	7.08	5.92	7.45	-0.59	0.558
Sample E	33	1.25	3.08	6.00	5.59	6.50	33	0.92	3.00	7.00	5.96	7.67	-0.21	0.833

Table 2C-3

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
FAMILY HAS PREVIOUS HEAD START EXPERIENCE	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	73	39	53.4	41	14	34.1	56	20	35.7	33	15	45.5
Sample B	55	35	63.6	41	11	26.8	11	5	45.5	30	12	40.0
Sample C	97	47	48.5	107	45	42.1	98	27	27.6	158	76	48.1
Sample D	17	10	58.8	67	19	28.4	35	11	31.4	34	10	29.4
Sample E	23	18	78.3	107	29	27.1	20	5	25.0	57	13	22.8
	CHI SQ = 8.425 DF = 4 P = 0.077			CHI SQ = 7.050 DF = 4 P = 0.133			CHI SQ = 2.544 DF = 4 P = 0.637			CHI SQ = 13.278 DF = 4 P = 0.010		
TWO-PARENT FAMILY	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	74	38	51.4	42	4	9.5	56	38	67.9	36	27	75.0
Sample B	56	34	60.7	41	11	26.8	11	8	72.7	31	26	83.9
Sample C	98	63	64.3	111	33	29.7	100	69	69.0	161	133	82.6
Sample D	21	10	47.6	70	9	12.9	39	29	74.4	37	29	78.4
Sample E	29	17	58.6	123	30	24.4	24	12	50.0	66	48	72.7
	CHI SQ = 4.034 DF = 4 P = 0.401			CHI SQ = 11.815 DF = 4 P = 0.019			CHI SQ = 4.442 DF = 4 P = 0.350			CHI SQ = 3.645 DF = 4 P = 0.456		
SEX OF TARGET CHILD	N	n Male	% Male	N	n Male	% Male	N	n Male	% Male	N	n Male	% Male
Sample A	74	37	50.0	42	26	61.9	56	27	48.2	36	19	52.8
Sample B	56	28	50.0	41	23	56.1	11	4	36.4	31	20	64.5
Sample C	98	47	48.0	111	54	48.6	100	50	50.0	161	80	49.7
Sample D	21	9	42.9	71	32	45.1	39	23	59.0	37	15	40.5
Sample E	29	15	51.7	123	65	52.8	24	13	54.2	66	32	48.5
	CHI SQ = 0.497 DF = 4 P = 0.974			CHI SQ = 4.457 DF = 4 P = 0.348			CHI SQ = 2.244 DF = 4 P = 0.691			CHI SQ = 4.001 DF = 4 P = 0.406		

Table 2C-3 (continued)

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
TARGET CHILD HAS BEEN IN DAYCARE	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	73	5	6.8	35	8	22.9	47	9	19.1	35	0	0.0
Sample B	55	2	3.6	31	1	3.2	10	2	20.0	30	0	0.0
Sample C	95	13	13.7	101	9	8.9	81	20	24.7	158	1	0.6
Sample D	21	2	9.5	70	16	22.9	38	13	34.2	37	0	0.0
Sample E	29	5	17.2	123	34	27.6	24	9	37.5	66	0	0.0
	CHI SQ = 6.467 DF = 4 P = 0.167			CHI SQ = 18.756 DF = 4 P = 0.001			CHI SQ = 4.308 DF = 4 P = 0.366			CHI SQ = 1.067 DF = 4 P = 0.900		
FAMILY HAS MEDICAL INSURANCE	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	67	47	70.1	42	30	71.4	55	10	18.2	33	25	75.8
Sample B	45	30	66.7	40	30	75.0	11	3	27.3	28	17	60.7
Sample C	92	47	51.1	108	86	79.6	98	29	29.6	155	89	57.4
Sample D	21	15	71.4	70	66	94.3	39	9	23.1	37	24	64.9
Sample E	29	16	55.2	123	110	89.4	24	4	16.7	66	50	75.8
	CHI SQ = 8.141 DF = 4 P = 0.087			CHI SQ = 17.156 DF = 4 P = 0.002			CHI SQ = 3.462 DF = 4 P = 0.484			CHI SQ = 9.016 DF = 4 P = 0.061		
FAMILY HAS DENTAL INSURANCE	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	74	43	58.1	42	25	59.5	56	6	10.7	36	16	44.4
Sample B	56	24	42.9	41	28	68.3	11	2	18.2	31	9	29.0
Sample C	98	36	36.7	110	78	70.9	100	18	18.0	161	45	28.0
Sample D	21	11	52.4	70	67	95.7	39	8	20.5	37	9	24.3
Sample E	29	12	41.4	122	105	86.1	24	1	4.2	65	26	40.0
	CHI SQ = 8.539 DF = 4 P = 0.074			CHI SQ = 31.884 DF = 4 P = 0.000			CHI SQ = 4.675 DF = 4 P = 0.322			CHI SQ = 6.830 DF = 4 P = 0.145		

Table 2C-3 (continued)

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
ANYONE IN HOUSEHOLD EMPLOYED	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	74	37	50.0	42	11	26.2	56	36	64.3	36	18	50.0
Sample B	56	39	69.6	41	10	24.4	11	8	72.7	31	11	35.5
Sample C	98	56	57.1	111	34	30.6	100	82	82.0	161	66	41.0
Sample D	21	12	57.1	69	7	10.1	39	26	66.7	37	16	43.2
Sample E	29	21	72.4	122	41	33.6	23	16	69.6	65	18	27.7
	CHI SQ = 7.432 DF = 4 P = 0.115			CHI SQ = 13.612 DF = 4 P = 0.009			CHI SQ = 7.245 DF = 4 P = 0.124			CHI SQ = 6.029 DF = 4 P = 0.197		
HOUSEHOLD RECEIVES UNEMPLOYMENT BENEFITS	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	73	4	5.5	42	1	2.4	55	3	5.5	36	1	2.8
Sample B	55	3	5.5	40	2	5.0	11	0	0.0	31	0	0.0
Sample C	98	5	5.1	109	5	4.6	97	0	0.0	158	15	9.5
Sample D	20	2	10.0	70	0	0.0	39	3	7.7	36	1	2.8
Sample E	29	0	0.0	122	7	5.7	24	1	4.2	66	4	6.1
	CHI SQ = 2.581 DF = 4 P = 0.628			CHI SQ = 4.446 DF = 4 P = 0.349			CHI SQ = 7.305 DF = 4 P = 0.121			CHI SQ = 6.214 DF = 4 P = 0.184		
HOUSEHOLD RECEIVES WELFARE BENEFITS	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes	N	n Yes	% Yes
Sample A	74	38	51.4	42	35	83.3	56	19	33.9	36	17	47.2
Sample B	56	22	39.3	41	35	85.4	11	4	36.4	31	21	67.7
Sample C	98	33	33.7	111	83	74.8	100	24	24.0	161	73	45.3
Sample D	21	10	47.6	70	66	94.3	39	10	25.6	37	14	37.8
Sample E	29	15	51.7	123	91	74.0	24	6	25.0	66	39	59.1
	CHI SQ = 6.970 DF = 4 P = 0.138			CHI SQ = 14.689 DF = 4 P = 0.005			CHI SQ = 2.356 DF = 4 P = 0.671			CHI SQ = 9.756 DF = 4 P = 0.045		

Table 2C-4

FAMILIES WITH PREVIOUS HEAD START EXPERIENCE FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	30	25	16	40	16	17	16
	n	23	16	9	5	16	4	9	6
	%	53.5	53.3	36.0	31.3	40.0	25.0	52.9	37.5
		CHI SQ = 0.000 DF = 1 P = 0.990		CHI SQ = 0.098 DF = 1 P = 0.754		CHI SQ = 1.120 DF = 1 P = 0.290		CHI SQ = 0.793 DF = 1 P = 0.373	
Sample B	N	34	21	12	29	10	1	17	13
	n	22	13	5	6	5	0	9	3
	%	64.7	61.9	41.7	20.7	50.0	0.0	52.9	23.1
		CHI SQ = 0.044 DF = 1 P = 0.834		CHI SQ = 1.903 DF = 1 P = 0.168		FISHER'S EXACT TEST DF = 1 P = 0.545		CHI SQ = 2.738 DF = 1 P = 0.098	
Sample C	N	50	47	70	37	55	43	82	76
	n	27	20	35	10	17	10	50	26
	%	54.0	42.6	50.0	27.0	30.9	23.3	61.0	34.2
		CHI SQ = 1.271 DF = 1 P = 0.260		CHI SQ = 5.242 DF = 1 P = 0.022		CHI SQ = 0.708 DF = 1 P = 0.400		CHI SQ = 11.319 DF = 1 P = 0.001	
Sample D	N	7	10	33	34	18	17	21	13
	n	5	5	8	11	5	6	7	3
	%	71.4	50.0	24.2	32.4	27.8	35.3	33.3	23.1
		FISHER'S EXACT TEST DF = 1 P = 0.354		CHI SQ = 0.542 DF = 1 P = 0.461		CHI SQ = 0.229 DF = 1 P = 0.632		CHI SQ = 0.407 DF = 1 P = 0.524	
Sample E	N	10	13	57	50	7	13	29	28
	n	7	11	16	13	2	3	6	7
	%	70.0	84.6	28.1	26.0	28.6	23.1	20.7	25.0
		CHI SQ = 0.710 DF = 1 P = 0.400		CHI SQ = 0.058 DF = 1 P = 0.810		FISHER'S EXACT TEST DF = 1 P = 0.594		CHI SQ = 0.150 DF = 1 P = 0.698	

Table 20-4 (continued)

TWO-PARENT FAMILIES FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
	n	23	15	1	3	25	13	15	12
	%	53.5	48.4	4.0	17.6	62.5	81.3	83.3	66.7
		CHI SQ = 0.188 DF = 1 P = 0.665		CHI SQ = 2.187 DF = 1 P = 0.139		CHI SQ = 1.842 DF = 1 P = 0.175		CHI SQ = 1.333 DF = 1 P = 0.248	
Sample B	N	34	22	12	29	10	1	17	14
	n	19	15	4	7	8	0	13	13
	%	55.9	68.2	33.3	24.1	80.0	0.0	76.5	92.9
		CHI SQ = 0.847 DF = 1 P = 0.357		CHI SQ = 0.366 DF = 1 P = 0.545		FISHER'S EXACT TEST DF = 1 P = 0.273		CHI SQ = 1.524 DF = 1 P = 0.217	
Sample C	N	50	48	71	40	56	44	84	77
	n	35	28	21	12	44	25	66	67
	%	70.0	58.3	29.6	30.0	78.6	56.8	78.6	87.0
		CHI SQ = 1.452 DF = 1 P = 0.228		CHI SQ = 0.002 DF = 1 P = 0.963		CHI SQ = 5.451 DF = 1 P = 0.020		CHI SQ = 1.993 DF = 1 P = 0.158	
Sample D	N	9	12	36	34	22	17	22	15
	n	6	4	5	4	16	13	16	13
	%	66.7	33.3	13.9	11.8	72.7	76.5	72.7	86.7
		CHI SQ = 2.291 DF = 1 P = 0.130		CHI SQ = 0.070 DF = 1 P = 0.791		CHI SQ = 0.070 DF = 1 P = 0.791		CHI SQ = 1.023 DF = 1 P = 0.312	
Sample E	N	12	17	63	60	9	15	33	33
	n	7	10	15	15	4	8	26	22
	%	58.3	58.8	23.8	25.0	44.4	53.3	78.8	66.7
		CHI SQ = 0.001 DF = 1 P = 0.979		CHI SQ = 0.024 DF = 1 P = 0.878		CHI SQ = 0.178 DF = 1 P = 0.673		CHI SQ = 1.222 DF = 1 P = 0.269	

Table 2C-4 (continued)

MALE CHILDREN FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	10
	n	18	19	15	11	17	10	10	9
	%	41.9	61.3	60.0	64.7	42.5	62.5	55.6	90.0
		CHI SQ = 2.720		CHI SQ = 0.002		CHI SQ = 1.831		CHI SQ = 0.444	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.099		P = 0.963		P = 0.176		P = 0.505	
Sample B	N	34	22	12	29	10	1	17	14
	n	18	10	8	15	3	1	11	9
	%	52.9	45.5	66.7	51.7	30.0	100.0	64.7	64.3
		CHI SQ = 0.299		CHI SQ = 0.769		FISHER'S EXACT TEST		CHI SQ = 0.001	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.584		P = 0.380		P = 0.364		P = 0.981	
Sample C	N	50	48	71	40	56	44	84	77
	n	21	26	34	20	36	14	44	36
	%	42.0	54.2	47.9	50.0	64.3	31.8	52.4	46.8
		CHI SQ = 1.452		CHI SQ = 0.046		CHI SQ = 10.380		CHI SQ = 0.509	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.228		P = 0.831		P = 0.001		P = 0.476	
Sample D	N	9	12	36	35	22	17	22	15
	n	3	6	17	15	16	7	9	6
	%	33.3	50.0	47.2	42.9	72.7	41.2	40.9	40.0
		CHI SQ = 0.583		CHI SQ = 0.068		CHI SQ = 3.946		CHI SQ = 0.003	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.445		P = 0.794		P = 0.047		P = 0.956	
Sample E	N	12	17	63	60	9	15	33	33
	n	9	6	34	31	4	9	17	15
	%	75.0	35.3	54.0	51.7	44.4	60.0	51.5	45.5
		CHI SQ = 4.441		CHI SQ = 0.065		CHI SQ = 0.548		CHI SQ = 0.243	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.035		P = 0.798		P = 0.459		P = 0.622	

Table 2C-4 (continued)

CHILDREN IN DAYCARE FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	30	19	16	34	13	17	18
	n	2	3	2	6	7	2	0	0
	%	4.7	10.0	10.5	37.5	20.6	15.4	0.0	0.0
		CHI SQ = 0.792 DF = 1 P = 0.373		CHI SQ = 3.584 DF = 1 P = 0.058		CHI SQ = 0.164 DF = 1 P = 0.685			
Sample B	N	33	22	9	22	9	1	16	14
	n	1	1	1	0	2	0	0	0
	%	3.0	4.5	11.1	0.0	22.2	0.0	0.0	0.0
		CHI SQ = 0.086 DF = 1 P = 0.769		CHI SQ = 2.526 DF = 1 P = 0.112		FISHER'S EXACT TEST DF = 1 P = 0.800			
Sample C	N	50	45	65	36	51	30	84	74
	n	9	4	4	5	11	9	0	1
	%	18.0	8.9	6.2	13.9	21.6	30.0	0.0	1.4
		CHI SQ = 1.685 DF = 1 P = 0.197		CHI SQ = 1.708 DF = 1 P = 0.191		CHI SQ = 0.722 DF = 1 P = 0.395		CHI SQ = 1.142 DF = 1 P = 0.285	
Sample D	N	9	12	36	34	21	17	22	18
	n	1	1	7	9	8	5	0	0
	%	11.1	8.3	19.4	26.5	38.1	29.4	0.0	0.0
		CHI SQ = 0.046 DF = 1 P = 0.830		CHI SQ = 0.490 DF = 1 P = 0.484		CHI SQ = 0.315 DF = 1 P = 0.575			
Sample E	N	12	17	63	60	9	15	33	33
	n	1	4	16	18	3	6	0	0
	%	8.3	23.5	25.4	30.0	33.3	40.0	0.0	0.0
		CHI SQ = 1.138 DF = 1 P = 0.286		CHI SQ = 0.326 DF = 1 P = 0.568		CHI SQ = 0.107 DF = 1 P = 0.744			

Table 2C-4 (continued)

FAMILIES WITH MEDICAL INSURANCE FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	41	26	25	17	39	16	17	16
	n	32	15	16	14	8	2	14	11
	%	78.0	57.7	64.0	82.4	20.5	12.5	82.4	68.8
		CHI SQ = 3.149 DF = 1 P = 0.076		CHI SQ = 1.670 DF = 1 P = 0.196		CHI SQ = 0.490 DF = 1 P = 0.484		CHI SQ = 0.830 DF = 1 P = 0.362	
Sample B	N	28	17	12	28	10	1	15	13
	n	20	10	9	21	3	0	9	8
	%	71.4	58.8	75.0	75.0	30.0	0.0	60.0	61.5
		CHI SQ = 0.756 DF = 1 P = 0.384		CHI SQ = 0.000 DF = 1 P = 1.000		FISHER'S EXACT TEST DF = 1 P = 0.727		CHI SQ = 0.007 DF = 1 P = 0.934	
Sample C	N	44	48	69	39	55	43	82	73
	n	20	27	62	24	18	11	47	42
	%	45.5	56.3	89.9	61.5	32.7	25.6	57.3	57.5
		CHI SQ = 1.071 DF = 1 P = 0.301		CHI SQ = 12.317 DF = 1 P = 0.000		CHI SQ = 0.591 DF = 1 P = 0.442		CHI SQ = 0.001 DF = 1 P = 0.978	
Sample D	N	9	12	36	34	22	17	22	15
	n	7	8	32	34	4	5	15	9
	%	77.8	66.7	88.9	100.0	18.2	29.4	68.2	60.0
		CHI SQ = 0.311 DF = 1 P = 0.577		CHI SQ = 4.007 DF = 1 P = 0.045		CHI SQ = 0.681 DF = 1 P = 0.409		CHI SQ = 0.262 DF = 1 P = 0.609	
Sample E	N	12	17	63	60	9	15	33	33
	n	6	10	57	53	4	0	24	26
	%	50.0	58.8	90.5	88.3	44.4	0.0	72.7	78.8
		CHI SQ = 0.221 DF = 1 P = 0.638		CHI SQ = 0.149 DF = 1 P = 0.699		CHI SQ = 8.000 DF = 1 P = 0.005		CHI SQ = 0.330 DF = 1 P = 0.566	

Table 20-4 (continued)

FAMILIES WITH DENTAL INSURANCE FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
	n	29	14	12	13	5	1	9	7
	%	67.4	45.2	48.0	76.5	12.5	6.3	50.0	38.9
		CHI SQ = 3.674 DF = 1 P = 0.055		CHI SQ = 3.404 DF = 1 P = 0.065		CHI SQ = 0.467 DF = 1 P = 0.494		CHI SQ = 0.450 DF = 1 P = 0.502	
Sample B	N	34	22	12	29	10	1	17	14
	n	17	7	9	19	2	0	6	3
	%	50.0	31.8	75.0	65.5	20.0	0.0	35.3	21.4
		CHI SQ = 1.803 DF = 1 P = 0.179		CHI SQ = 0.352 DF = 1 P = 0.553		FISHER'S EXACT TEST DF = 1 P = 0.818		CHI SQ = 0.716 DF = 1 P = 0.397	
Sample C	N	50	48	71	39	56	44	84	77
	n	16	20	55	23	10	8	25	20
	%	32.0	41.7	77.5	59.0	17.9	18.2	29.8	26.0
		CHI SQ = 0.985 DF = 1 P = 0.321		CHI SQ = 4.172 DF = 1 P = 0.041		CHI SQ = 0.002 DF = 1 P = 0.966		CHI SQ = 0.286 DF = 1 P = 0.593	
Sample D	N	9	12	36	34	22	17	22	15
	n	5	6	33	34	2	6	5	4
	%	55.6	50.0	91.7	100.0	9.1	35.3	22.7	26.7
		CHI SQ = 0.064 DF = 1 P = 0.801		CHI SQ = 2.960 DF = 1 P = 0.085		CHI SQ = 4.038 DF = 1 P = 0.044		CHI SQ = 0.075 DF = 1 P = 0.784	
Sample E	N	12	17	63	59	9	15	32	33
	n	5	7	55	50	1	0	11	15
	%	41.7	41.2	87.3	84.7	11.1	0.0	34.4	45.5
		CHI SQ = 0.001 DF = 1 P = 0.979		CHI SQ = 0.166 DF = 1 P = 0.684		CHI SQ = 1.739 DF = 1 P = 0.187		CHI SQ = 0.831 DF = 1 P = 0.362	

Table 2C-4 (continued)

SOMEONE IN HOUSEHOLD EMPLOYED FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
	n	25	12	5	6	27	9	9	9
	%	58.1	38.7	20.0	35.3	67.5	56.3	50.0	50.0
		CHI SQ = 2.720 DF = 1 P = 0.099		CHI SQ = 1.224 DF = 1 P = 0.268		CHI SQ = 0.630 DF = 1 P = 0.427		CHI SQ = 0.000 DF = 1 P = 1.000	
Sample B	N	34	22	12	29	10	1	17	14
	n	23	16	3	7	8	0	6	5
	%	67.6	72.7	25.0	24.1	80.0	0.0	35.3	35.7
		CHI SQ = 0.163 DF = 1 P = 0.686		CHI SQ = 0.003 DF = 1 P = 0.953		FISHER'S EXACT TEST DF = 1 P = 0.273		CHI SQ = 0.001 DF = 1 P = 0.981	
Sample C	N	50	48	71	40	56	44	84	77
	n	35	21	19	15	46	36	28	38
	%	70.0	43.8	26.8	37.5	82.1	81.8	33.3	49.4
		CHI SQ = 6.891 DF = 1 P = 0.009		CHI SQ = 1.389 DF = 1 P = 0.239		CHI SQ = 0.002 DF = 1 P = 0.966		CHI SQ = 4.261 DF = 1 P = 0.039	
Sample D	N	9	12	36	34	22	17	22	15
	n	5	7	4	3	15	11	13	3
	%	55.6	58.3	11.1	8.8	68.2	64.7	59.1	20.0
		CHI SQ = 0.016 DF = 1 P = 0.899		CHI SQ = 0.102 DF = 1 P = 0.750		CHI SQ = 0.052 DF = 1 P = 0.819		CHI SQ = 5.553 DF = 1 P = 0.018	
Sample E	N	12	17	63	60	9	15	33	33
	n	9	12	22	19	6	10	6	12
	%	75.0	70.6	34.9	31.7	66.7	66.7	18.2	36.4
		CHI SQ = 0.069 DF = 1 P = 0.793		CHI SQ = 0.146 DF = 1 P = 0.702		CHI SQ = 0.000 DF = 1 P = 1.000		CHI SQ = 2.750 DF = 1 P = 0.097	

Table 2C-4 (continued)

HOUSEHOLDS RECEIVING UNEMPLOYMENT BENEFITS FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	30	25	17	40	15	18	18
	n	0	4	1	0	3	0	0	1
	%	0.0	13.3	4.0	0.0	7.5	0.0	0.0	5.6
		CHI SQ = 6.066 DF = 1 P = 0.014		CHI SQ = 0.697 DF = 1 P = 0.404		CHI SQ = 1.190 DF = 1 P = 0.275		CHI SQ = 1.029 DF = 1 P = 0.310	
Sample B	N	33	22	12	28	10	1	17	14
	n	0	3	0	2	0	0	0	0
	%	0.0	13.6	0.0	7.1	0.0	0.0	0.0	0.0
		CHI SQ = 4.780 DF = 1 P = 0.029		CHI SQ = 0.902 DF = 1 P = 0.342					
Sample C	N	50	48	70	39	54	43	82	76
	n	4	1	3	2	0	0	5	10
	%	8.0	2.1	4.3	5.1	0.0	0.0	6.1	13.2
		CHI SQ = 1.771 DF = 1 P = 0.183		CHI SQ = 0.041 DF = 1 P = 0.840				CHI SQ = 2.288 DF = 1 P = 0.130	
Sample D	N	8	12	36	34	22	17	22	14
	n	1	1	0	0	1	2	0	1
	%	12.5	8.3	0.0	0.0	4.5	11.8	0.0	7.1
		FISHER'S EXACT TEST DF = 1 P = 0.653				CHI SQ = 0.704 DF = 1 P = 0.401		CHI SQ = 1.616 DF = 1 P = 0.204	
Sample E	N	12	17	62	60	9	15	33	33
	n	0	0	4	3	1	0	3	1
	%	0.0	0.0	6.5	5.0	11.1	0.0	9.1	3.0
				CHI SQ = 0.119 DF = 1 P = 0.730		CHI SQ = 1.739 DF = 1 P = 0.187		CHI SQ = 1.065 DF = 1 P = 0.302	

Table 2C-4 (continued)

HOUSEHOLDS RECEIVING WELFARE BENEFITS FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
	n	22	16	19	16	12	7	10	7
	%	51.2	51.6	76.0	94.1	30.0	43.8	55.6	38.9
		CHI SQ = 0.001 DF = 1 P = 0.969		CHI SQ = 2.392 DF = 1 P = 0.122		CHI SQ = 0.964 DF = 1 P = 0.326		CHI SQ = 1.003 DF = 1 P = 0.317	
Sample B	N	34	22	12	29	10	1	17	14
	n	14	8	9	26	3	1	10	11
	%	41.2	36.4	75.0	89.7	30.0	100.0	58.8	78.6
		CHI SQ = 0.130 DF = 1 P = 0.719		CHI SQ = 1.458 DF = 1 P = 0.227		FISHER'S EXACT TEST DF = 1 P = 0.364		CHI SQ = 1.370 DF = 1 P = 0.242	
Sample C	N	50	48	71	40	56	44	84	77
	n	12	21	54	29	16	8	51	22
	%	24.0	43.8	76.1	72.5	28.6	18.2	60.7	28.6
		CHI SQ = 4.277 DF = 1 P = 0.039		CHI SQ = 0.172 DF = 1 P = 0.679		CHI SQ = 1.458 DF = 1 P = 0.227		CHI SQ = 16.748 DF = 1 P = 0.000	
Sample D	N	9	12	36	34	22	17	22	15
	n	4	6	34	32	6	4	8	6
	%	44.4	50.0	94.4	94.1	27.3	23.5	36.4	40.0
		CHI SQ = 0.064 DF = 1 P = 0.801		CHI SQ = 0.003 DF = 1 P = 0.953		CHI SQ = 0.070 DF = 1 P = 0.791		CHI SQ = 0.050 DF = 1 P = 0.823	
Sample E	N	12	17	63	60	9	15	33	33
	n	6	9	46	45	1	5	19	20
	%	50.0	52.9	73.0	75.0	11.1	33.3	57.6	60.6
		CHI SQ = 0.024 DF = 1 P = 0.876		CHI SQ = 0.063 DF = 1 P = 0.802		CHI SQ = 1.481 DF = 1 P = 0.223		CHI SQ = 0.063 DF = 1 P = 0.802	

Table 2C-4 (continued)

BIRTH ORDER OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	41	30	25	17	40	16	17	17
First Born	n	12	13	7	8	13	6	6	7
	%	29.3	43.3	28.0	47.1	32.5	37.5	35.3	41.2
Second Born	n	12	6	10	5	8	4	2	4
	%	29.3	20.0	40.0	29.4	20.0	25.0	11.8	23.5
Third Born	n	9	6	4	0	6	4	3	3
	%	22.0	20.0	16.0	0.0	15.0	25.0	17.6	17.6
Fourth Born	n	6	3	2	1	5	1	3	2
	%	14.6	10.0	8.0	5.9	12.5	6.3	17.6	11.8
Over Fourth	n	2	2	2	3	7	1	3	1
	%	4.9	6.7	8.0	17.6	20.0	6.3	17.6	5.9
		CHI SQ = 1.983 DF = 4 P = 0.739		CHI SQ = 4.921 DF = 4 P = 0.296		CHI SQ = 2.619 DF = 4 P = 0.624		CHI SQ = 1.944 DF = 4 P = 0.746	
Sample B	N	34	22	12	29	10	1	17	14
First Born	n	12	6	5	14	4	1	7	5
	%	35.3	27.3	41.7	48.3	40.0	100.0	41.2	35.7
Second Born	n	11	5	5	7	2	0	7	2
	%	32.4	22.7	41.7	24.1	20.0	0.0	41.2	14.3
Third Born	n	5	3	1	1	1	0	1	2
	%	14.7	13.6	8.3	3.4	10.0	0.0	5.9	14.3
Fourth Born	n	2	3	0	2	3	0	1	2
	%	5.9	13.6	0.0	6.9	30.0	0.0	5.9	14.3
Over Fourth	n	4	5	1	5	0	0	1	3
	%	11.8	22.7	8.3	17.2	0.0	0.0	5.9	21.4
		CHI SQ = 2.610 DF = 4 P = 0.625		CHI SQ = 2.674 DF = 4 P = 0.614		CHI SQ = 1.320 DF = 3 P = 0.724		CHI SQ = 4.530 DF = 4 P = 0.339	

Table 2C-4 (continued)

BIRTH ORDER OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample C	N	50	48	70	40	54	44	83	75
First Born	n	18	17	21	18	16	15	26	26
	%	36.0	35.4	30.0	45.0	29.6	34.1	31.3	34.7
Second Born	n	14	10	19	7	16	15	22	23
	%	28.0	20.8	27.1	17.5	29.6	34.1	26.5	30.7
Third Born	n	4	10	17	8	10	6	16	9
	%	8.0	20.8	24.3	20.0	18.5	13.6	19.3	12.0
Fourth Born	n	3	2	6	3	4	5	7	9
	%	6.0	4.2	8.6	7.5	7.4	11.4	8.4	12.0
Over Fourth	n	11	9	7	4	8	3	12	8
	%	22.0	18.8	10.0	10.0	14.8	6.8	14.5	10.7
		CHI SQ = 3.627 DF = 4 P = 0.459		CHI SQ = 2.858 DF = 4 P = 0.582		CHI SQ = 2.453 DF = 4 P = 0.653		CHI SQ = 2.634 DF = 4 P = 0.621	
Sample D	N	9	10	36	33	21	17	22	14
First Born	n	5	2	12	7	2	3	9	4
	%	55.6	20.0	33.3	21.2	9.5	17.6	40.9	28.6
Second Born	n	3	4	10	8	6	1	5	5
	%	33.3	40.0	27.8	24.2	28.6	5.9	22.7	35.7
Third Born	n	1	2	5	11	4	5	4	1
	%	11.1	20.0	13.9	33.3	19.0	29.4	18.2	7.1
Fourth Born	n	0	0	5	3	5	3	2	1
	%	0.0	0.0	13.9	9.1	23.8	17.6	9.1	7.1
Over Fourth	n	0	2	4	4	4	5	2	3
	%	0.0	20.0	11.1	12.1	19.0	29.4	9.1	21.4
		CHI SQ = 3.720 DF = 3 P = 0.293		CHI SQ = 4.165 DF = 4 P = 0.384		CHI SQ = 4.118 DF = 4 P = 0.390		CHI SQ = 2.607 DF = 4 P = 0.626	

Table 2C-4 (continued)

BIRTH ORDER OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample E	N	11	17	60	59	9	14	32	33
First Born	n	4	5	22	26	4	3	10	18
	%	36.4	29.4	36.7	44.1	44.4	21.4	31.3	54.5
Second Born	n	4	4	14	17	4	5	10	2
	%	36.4	23.5	23.3	28.8	44.4	35.7	31.3	6.1
Third Born	n	0	1	11	9	0	2	3	5
	%	0.0	5.9	18.3	15.3	0.0	14.3	9.4	15.2
Fourth Born	n	0	4	6	2	1	3	4	3
	%	0.0	23.5	10.0	3.4	11.1	21.4	12.5	9.1
Over Fourth	n	3	3	7	5	0	1	5	5
	%	27.3	17.6	11.7	8.5	0.0	7.1	15.6	15.2
		CHI SQ = 4.010		CHI SQ = 3.149		CHI SQ = 3.324		CHI SQ = 8.248	
		DF = 4		DF = 4		DF = 4		DF = 4	
		P = 0.405		P = 0.533		P = 0.505		P = 0.083	

Table 2C-4 (continued)

ETHNICITY OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
White	n	1	2	0	0	4	2	18	18
	%	2.3	6.5	0.0	0.0	10.0	12.5	100.0	100.0
Black	n	42	29	25	17	1	0	0	0
	%	97.7	93.5	100.0	100.0	2.5	0.0	0.0	0.0
Hispanic	n	0	0	0	0	34	13	0	0
	%	0.0	0.0	0.0	0.0	85.0	81.3	0.0	0.0
Other	n	0	0	0	0	1	1	0	0
	%	0.0	0.0	0.0	0.0	2.5	6.3	0.0	0.0
		CHI SQ = 0.788 DF = 1 P = 0.375				CHI SQ = 0.936 DF = 3 P = 0.817			
Sample B	N	34	22	12	29	10	1	17	14
White	n	4	8	0	0	1	0	16	14
	%	11.8	36.4	0.0	0.0	10.0	0.0	94.1	100.0
Black	n	30	14	12	29	0	0	1	0
	%	88.2	63.6	100.0	100.0	0.0	0.0	5.9	0.0
Hispanic	n	0	0	0	0	9	1	0	0
	%	0.0	0.0	0.0	0.0	90.0	100.0	0.0	0.0
		CHI SQ = 4.801 DF = 1 P = 0.028				FISHER'S EXACT TEST DF = 1 P = 0.909		CHI SQ = 0.851 DF = 1 P = 0.356	

Table 2C-4 (continued)

ETHNICITY OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample C	N	50	48	71	40	56	44	84	77
White	n	18	12	0	0	23	9	73	76
	%	36.0	25.0	0.0	0.0	41.1	20.5	86.9	98.7
Black	n	32	36	67	39	4	2	10	1
	%	64.0	75.0	94.4	97.5	7.1	4.5	11.9	1.3
Hispanic	n	0	0	0	1	22	30	0	0
	%	0.0	0.0	0.0	2.5	39.3	68.2	0.0	0.0
Other	n	0	0	4	0	7	3	1	0
	%	0.0	0.0	5.6	0.0	12.5	6.8	1.2	0.0
		CHI SQ = 1.395 DF = 1 P = 0.238		CHI SQ = 4.055 DF = 2 P = 0.132		CHI SQ = 8.302 DF = 3 P = 0.040		CHI SQ = 8.135 DF = 2 P = 0.017	
Sample D	N	9	12	36	34	22	17	22	15
White	n	1	3	0	0	6	6	22	15
	%	11.1	25.0	0.0	0.0	27.3	35.3	100.0	100.0
Black	n	8	9	36	34	0	1	0	0
	%	88.9	75.0	100.0	100.0	0.0	5.9	0.0	0.0
Hispanic	n	0	0	0	0	16	9	0	0
	%	0.0	0.0	0.0	0.0	72.7	52.9	0.0	0.0
Other	n	0	0	0	0	0	1	0	0
	%	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0
		CHI SQ = 0.643 DF = 1 P = 0.422				CHI SQ = 3.374 DF = 3 P = 0.337			

Table 2C-4 (continued)

ETHNICITY OF TARGET CHILD FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample E	N	12	17	63	60	9	15	33	33
White	n	1	4	0	3	3	4	33	32
	%	8.3	23.5	0.0	5.0	33.3	26.7	100.0	97.0
Black	n	11	13	62	55	0	1	0	1
	%	91.7	76.5	98.4	91.7	0.0	6.7	0.0	3.0
Hispanic	n	0	0	0	1	4	9	0	0
	%	0.0	0.0	0.0	1.7	44.4	60.0	0.0	0.0
Other	n	0	0	1	1	2	1	0	0
	%	0.0	0.0	1.6	1.7	22.2	6.7	0.0	0.0
		CHI SQ = 1.138 DF = 1 P = 0.286		CHI SQ = 4.348 DF = 3 P = 0.226		CHI SQ = 2.026 DF = 3 P = 0.567		CHI SQ = 1.015 DF = 1 P = 0.314	

Table 2C-4 (continued)

PARTICIPATION IN FOOD ASSISTANCE PROGRAMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample A	N	43	31	25	17	40	16	18	18
None	n	6	5	1	0	13	8	6	10
	%	14.0	16.1	4.0	0.0	32.5	50.0	33.3	55.6
Foodstamps	n	10	7	10	8	18	5	5	2
	%	23.3	22.6	40.0	47.1	45.0	31.3	27.8	11.1
Wic	n	7	4	2	3	2	0	0	0
	%	16.3	12.9	8.0	17.6	5.0	0.0	0.0	0.0
Both	n	20	15	12	6	7	3	7	6
	%	46.5	48.4	48.0	35.3	17.5	18.8	38.9	33.3
		CHI SQ = 0.212 DF = 3 P = 0.976		CHI SQ = 1.970 DF = 3 P = 0.579		CHI SQ = 2.269 DF = 3 P = 0.518		CHI SQ = 2.363 DF = 2 P = 0.307	
Sample B	N	34	22	12	29	10	1	17	14
None	n	10	6	2	4	4	0	4	1
	%	29.4	27.3	16.7	13.8	40.0	0.0	23.5	7.1
Foodstamps	n	3	6	1	9	4	0	3	7
	%	8.8	27.3	8.3	31.0	40.0	0.0	17.6	50.0
Wic	n	6	5	1	1	0	0	2	1
	%	17.6	22.7	8.3	3.4	0.0	0.0	11.8	7.1
Both	n	15	5	8	15	2	1	8	5
	%	44.1	22.7	66.7	51.7	20.0	100.0	47.1	35.7
		CHI SQ = 4.737 DF = 3 P = 0.192		CHI SQ = 2.594 DF = 3 P = 0.458		CHI SQ = 2.933 DF = 2 P = 0.231		CHI SQ = 4.174 DF = 3 P = 0.243	

Table 2C-4 (continued)

PARTICIPATION IN FOOD ASSISTANCE PROGRAMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample C	N	50	48	71	40	56	44	84	77
None	n	9	5	3	10	25	23	34	41
	%	18.0	10.4	4.2	25.0	44.6	52.3	40.5	53.2
Foodstamps	n	11	10	11	13	20	18	24	20
	%	22.0	20.8	15.5	32.5	35.7	40.9	28.6	26.0
Wic	n	8	9	14	1	1	1	5	4
	%	16.0	18.8	19.7	2.5	1.8	2.3	6.0	5.2
Both	n	22	24	43	16	10	2	21	12
	%	44.0	50.0	60.6	40.0	17.9	4.5	25.0	15.6
		CHI SQ = 1.296 DF = 3 P = 0.730		CHI SQ = 20.500 DF = 3 P = 0.000		CHI SQ = 4.142 DF = 3 P = 0.247		CHI SQ = 3.284 DF = 3 P = 0.350	
Sample D	N	9	12	36	34	22	17	22	15
None	n	2	3	3	3	11	6	11	7
	%	22.2	25.0	8.3	8.8	50.0	35.3	50.0	46.7
Foodstamps	n	2	3	10	17	8	8	6	4
	%	22.2	25.0	27.8	50.0	36.4	47.1	27.3	26.7
Wic	n	2	1	2	1	1	2	0	2
	%	22.2	8.3	5.6	2.9	4.5	11.8	0.0	13.3
Both	n	3	5	21	13	2	1	5	2
	%	33.3	41.7	58.3	38.2	9.1	5.9	22.7	13.3
		CHI SQ = 0.822 DF = 3 P = 0.844		CHI SQ = 3.877 DF = 3 P = 0.264		CHI SQ = 1.521 DF = 3 P = 0.677		CHI SQ = 3.371 DF = 3 P = 0.338	

Table 2C-4 (continued)

PARTICIPATION IN FOOD ASSISTANCE PROGRAMS FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLES BY SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Sample E	N	12	17	63	60	9	15	33	33
None	n	3	3	13	17	3	5	10	14
	%	25.0	17.6	20.6	28.3	33.3	33.3	30.3	42.4
Foodstamps	n	4	7	19	8	3	7	11	10
	%	33.3	41.2	30.2	13.3	33.3	46.7	33.3	30.3
Wic	n	1	3	8	6	0	2	1	2
	%	8.3	17.6	12.7	10.0	0.0	13.3	3.0	6.1
Both	n	4	4	23	29	3	1	11	7
	%	33.3	23.5	36.5	48.3	33.3	6.7	33.3	21.2
		CHI SQ = 0.985 DF = 3 P = 0.805		CHI SQ = 5.923 DF = 3 P = 0.116		CHI SQ = 3.840 DF = 3 P = 0.279		CHI SQ = 1.937 DF = 3 P = 0.586	

Table 2C-5

Health Status Comparison of Longitudinal and Pretest Attrition Sample

		Sample A (n=208)	Sample D (n=167)	Chi-Squared Significance
Number of problems per child from medical examination (excluding pica)				
0	n	93/208	84/167	
	%	44.7	50.3	
1	n	74/208	54/167	
	%	35.6	32.3	
2	n	32/208	20/167	
	%	15.4	12.0	
3	n	5/208	6/167	
	%	2.4	3.6	
4	n	3/208	3/167	
	%	1.4	1.8	
6	n	1/208		
	%	0.5		0.70
Severity of Medical Problems				
Mild	n	108/158	77/114	
	%	68.4	67.5	
Moderate	n	49/158	33/114	
	%	31.0	28.9	
Severe	n	1/158	4/114	
	%	0.6	3.5	0.21
	Mean	1.65	1.72	
	St. Dev.	0.96	1.10	
	n	158	114	

Table 2C-5 (continued)

Health Status Comparison of Longitudinal and Pretest Attrition Sample

		Sample A (n=208)	Sample D (n=167)	Chi-Squared Significance
Specific Medical Problems				
Recurrent Otitis Media	n	9/208	10/167	0.62
	%	4.3	6.0	
Serous Otitis Media	n	23/208	11/167	0.19
	%	11.1	6.6	
Acute Otitis Media	n	3/208	2/167	1.00
	%	1.4	1.2	
Urinary Tract Infection	n	7/208		0.04
	%	3.4		
Asthma	n	12/208	10/167	1.00
	%	5.8	6.0	
Eczema	n	4/208	2/167	0.89
	%	1.9	1.2	
Congenital Cardiac	n	5/208	4/167	1.00
	%	2.4	2.4	
Rheumatic Fever	n			
	%			
Hypertension	n	2/208	1/167	1.00
	%	1.0	0.6	
Any Cardiovascular	n	7/208	5/167	1.00
	%	3.4	3.0	
Seizures	n	4/208	5/167	0.74
	%	1.9	3.0	
Secondary to Head Trauma	n	1/208		
	%	0.5		
Febrile Seizures	n	1/208		
	%	0.5		
Neurologic	n	6/208	5/167	1.00
	%	2.9	3.0	

Table 2C-5 (continued)

Health Status Comparison of
Longitudinal and Pretest Attrition Sample

		Sample A (n=208)	Sample D (n=167)	Chi-Squared Significance
Specific Medical Problems				
Inguinal Hernias Media	n	3/208		
	%	1.4		
Undescended Testes Media	n	3/208		
	%	1.4		
Umbilical Hernia	n	3/208	3/167	1.00
	%	1.4	1.8	
Femoral Hernia	n		1/167	
	%		0.6	
Surgical	n	9/208	4/167	0.46
	%	4.3	2.4	
Not toilet trained	n	6/208	2/167	0.44
	%	2.9	1.2	
Enuresis	n	4/208	4/167	0.74
	%	1.9	6.8	
Toilet Problems	n	10/208	7/167	0.97
	%	4.8	4.2	
Underweight	n	1/208		1.00
	%	0.5		
Obesity	n	7/208	2/167	0.31
	%	3.4	1.2	
Nutritional Problems	n	8/208	2/167	0.21
	%	3.8	1.2	
Breath Holding	n	3/208		
	%	1.4		
Self-Induced Vomiting	n		1/167	
	%		0.6	

Table 2C-5 (continued)

Health Status Comparison of Longitudinal and Pretest Attrition Sample

		Sample A (n=208)	Sample B (n=167)	Chi-Squared Significance
Specific Medical Problems				
Undifferentiated	n	2/208	2/167	1.00
	%	1.0	1.2	
Hyperactive	n	2/208	1/167	1.00
	%	1.0	0.6	
Depressed Mother	n	1/208	1/167	1.00
	%	0.5	0.6	
Psychosocial	n	7/208	5/167	1.00
	%	3.4	3.0	
Sickle Cell Anemia	n	2/208		
	%	1.0		
Congenital Anomalies	n	1/208		
	%	0.5		
Allergies	n	19/208	10/167	0.35
	%	9.1	6.0	
Dermatologic	n	9/208	9/167	0.81
	%	4.3	5.4	
Chronic	n	13/208	9/167	0.90
	%	6.3	5.4	
Total Number of Summary Problems Per Child				
0	n	113/208	102/167	
	%	54.3	61.1	
1	n	42/208	32/167	
	%	20.2	19.2	
2	n	26/208	17/167	
	%	12.5	10.2	
3	n	17/208	12/167	
	%	8.2	7.2	
4	n	4/208	1/167	
	%	1.9	0.6	
5	n	1/208	1/167	
	%	0.5	0.6	
6	n	4/208	1/167	
	%	1.9	0.6	
7	n	1/208		
	%	0.5		0.71
Total Number of Summary Problems	n	187/208	107/167	
	%	89.9	64.1	

Table 2C-5 (continued)

Health Status Comparison of Longitudinal and Pretest Attrition Sample

			Sample A (n=208)	Sample D (n=168)	Chi-Squared Significance
Physical Examination Referrals for Urgent Problems		n	7/206	6/167	1.00
		%	3.4	3.6	
Vision Referrals-Number of Problems Per Child	0	n	175/208	139/168	0.75
		%	84.1	82.7	
	1	n	20/208	19/168	
		%	9.6	11.3	
	2	n	8/208	8/168	
		%	3.8	4.8	
	3	n	5/208	2/168	
		%	2.4	1.2	
Total Number of Vision Referrals		n	51/208	41/168	0.79
		%	24.5	24.4	
Total Number of Speech Referrals		n	57/208	49/168	0.79
		%	27.4	29.2	
Dental Referrals-Number of Urgent Problems per Child	0	n	176/208	136/168	
		%	84.6	81.0	
	1	n	24/208	19/168	
		%	11.5	11.3	
	2	n	2/208	8/168	
		%	1.0	4.8	
	3	n	6/208	5/168	
		%	2.9	3.0	0.16
Total Number of Dental Referrals For Urgent Problems		n	46/208	50/168	
		%	22.1	29.8	
Hearing Examination-Failed 500, 1000, or 2000 HZ in Either Ear		n	54/208	42/168	0.93
		%	26.0	25.0	
McCarthy Motor Scale Percentile		Mean	26.42	19.07	
		St. Dev.	25.84	22.58	
		n	203	165	
McCarthy Refusals		Mean	6.49	7.24	
		St. Dev.	14.13	14.53	
		n	208	168	
Height Percentile		Mean	45.61	42.94	
		St. Dev.	24.44	26.71	
		n	191	154	
Weight Percentile		Mean	51.62	48.26	
		St. Dev.	24.94	25.40	
		n	190	154	

Table 2C-6

Health Status Comparison of Longitudinal and Augmentation Sample

		Sample A (n=208)	Sample C (n=470)	Chi-Squared Significance
Number of problems per child from medical examination (excluding pica)				
0	n	113/208	273/470	
	%	54.3	58.1	
1	n	65/208	131/470	
	%	31.3	27.9	
2	n	21/208	44/470	
	%	10.1	9.4	
3	n	8/208	18/470	
	%	3.8	3.8	
4	n	1/208	4/470	
	%	0.5	0.9	
				0.7
Severity of Medical Problems				
Mild	n	52/101	83/191	
	%	51.5	43.5	
Moderate	n	48/101	103/191	
	%	47.5	53.9	
Severe	n	1/101	5/191	
	%	1.0	2.6	0.4
	Mean	1.99	2.18	
	St. Dev.	1.04	1.09	
	n	101	191	

Table 2C-6 (continued)

Health Status Comparison of Longitudinal and Augmentation Sample

			Sample A (n=208)	Sample C (n=470)	Chi-Squared Significance
Total Number of Summary Problems Per Child					
	0	n	125/207	310/468	
		%	60.4	66.2	
	1	n	25/207	77/468	
		%	12.1	16.5	
	2	n	29/207	44/468	
		%	14.0	9.4	
	3	n	20/207	26/468	
		%	9.7	5.6	
	4	n	3/207	8/468	
		%	1.4	1.7	
	5	n	4/207	2/468	
		%	1.9	0.4	
	6	n	1/207	1/468	
		%	0.5	0.2	
	7	n	1/208		0.70
		%	0.5		
Total Number of Summary Problems		n	181/207	291/468	
		%	87.4	62.2	
Percentile Ranks for McCarthy Index		Mean	35.82	37.10	
		St. Dev.	27.44	28.65	
		n	208	470	
Height Percentile		Mean	43.31	46.93	
		St. Dev.	24.39	24.94	
		n	206	456	
Weight Percentile		Mean	47.18	50.22	
		St. Dev.	25.59	25.34	
		n	205	463	
Total Developmental Refusals		Mean	1.57	2.11	
		St. Dev.	4.14	5.25	
		n	208	470	

Table 2C-6 (continued)

Health Status Comparison of Longitudinal and Augmentation Sample

			Sample A (n=208)	Sample C (n=470)	Chi-Squared Significance
Physical Examination Referrals for Urgent Problems		n	4/207	13/468	
		%	1.9	2.8	0.79
Vision Referrals-Number of Problems Per Child	0	n	153/208	341/470	
		%	73.6	72.6	
	1	n	30/208	68/470	
		%	14.4	14.5	
	2	n	24/208	54/470	
		%	11.5	11.5	
	3	n	1/208	7/470	
		%	0.5	1.5	0.28
Total Number of Vision Referrals		n	81/208	191/470	
		%	38.9	40.6	
Total Number of Speech Referrals		n	67/208	128/470	
		%	32.2	27.2	0.40
Dental Referrals-Number of Urgent Problems per Child	0	n	183/208	401/470	
		%	88.0	85.3	
	1	n	17/208	41/470	
		%	8.2	8.7	
	2	n	5/208	16/470	
		%	2.4	3.4	
	3	n	3/208	11/470	0.82
		%	2.4	3.4	
Total Number of Dental Referrals For Urgent Problems		n	36/208	116/470	
		%	17.3	24.7	
Hearing Examination-Failed 500, 1000, or 2000 HZ in Either Ear		n	21/208	55/470	0.31
		%	10.1	11.7	

CHAPTER THREE

APPENDIX TABLES

Table 3-1

Listing of Children Referred for Urgent Medical Needs Based on the Pretest for Samples A and D[a, b]

Head Start, Sample A

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	EARS - HIGH PEP
[illegible]	DENTAL
[illegible]	HIGH PEP
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	EARS
[illegible]	HIGH PEP
[illegible]	SUBCONJUNCTIVAL HEMORRHAGE
[illegible]	DENTAL
[illegible]	HEART MURMUR
[illegible]	PICA-NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	EARS
[illegible]	PICA-NO LEAD TEST
[illegible]	ALLERGY-POLLENOSIS - PICA-NO LEAD TEST
[illegible]	PICA
[illegible]	HEART MURMUR
[illegible]	BREATH HOLDING - HEART MURMUR - LYMPHADENOPATHY
[illegible]	INGUINAL HERNIA
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	VISION
[illegible]	DENTAL

Head Start, Sample D

ID Number	Health Problem
[illegible]	HIGH PEP
[illegible]	DENTAL
[illegible]	SEIZURES WITH FEVER - PICA-NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	CHRONIC EAR INFECTION
[illegible]	HEART MURMUR
[illegible]	HEART MURMUR - SMALL STATURE
[illegible]	NITS
[illegible]	DENTAL - NITS
[illegible]	DENTAL
[illegible]	EARS
[illegible]	NUTRITION - VISION
[illegible]	DENTAL
[illegible]	DENTAL - NUTRITION
[illegible]	MEDICAL - NUTRITION

Non-Head Start, Sample A

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	HIGH PEP
[illegible]	HIGH PEP
[illegible]	HIGH PEP
[illegible]	PICA-NO LEAD TEST
[illegible]	INFECTED SCALP AND THIGH - HYPERACTIVE
[illegible]	- BREATH HOLDING-CONVULSIONS - PICA-NO LEAD TEST
521199	NO LEAD TEST
[illegible]	CYST ON PENIS
[illegible]	HEAD INJURY - SMALL STATURE - DEVELOPMENTAL DELAY
[illegible]	NITS
[illegible]	JUVENILE DIABETES - EARS
[illegible]	DENTAL - VISION - NUTRITION
[illegible]	VISION
[illegible]	VISION
[illegible]	DENTAL - NUTRITION

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[a] See Table 2A-7 for the syntax of the ID number.

[b] Sample A is the randomly assigned longitudinal sample. Sample V is the randomly assigned attrition sample which was pretested.

Table 3-1 (continued)

Listing of Children Referred for Urgent Medical Needs Based on the Pretest for Samples A and D[a, b]

Non-Head Start, Sample D

ID Number	Health Problem
[illegible]	HEART MURMUR
[illegible]	DENTAL
[illegible]	HIGH PEP
[illegible]	HIGH PEP
[illegible]	HIGH PEP
[illegible]	LEAD-CONSTIPATION
[illegible]	PICA-NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	HIGH PEP
[illegible]	NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	EARDRUMS RETRACTED,LEFT AND RIGHT - NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	HIGH PEP
[illegible]	NO LEAD TEST
[illegible]	PICA-NO LEAD TEST
[illegible]	HYPERPIGMENTATION-IMPETIGO LIKELY - NO LEAD TEST
[illegible]	PICA-NO LEAD TEST - ANEMIA
[illegible]	[illegible] WITH FEVER - ANEMIA - PICA
[illegible]	[illegible] FEVER
[illegible]	PICA NO LEAD TEST - ANEMIA
[illegible]	HIGH PEP
[illegible]	HIGH PEP
[illegible]	ELEVATED BLOOD PRESSURE - OBESITY
[illegible]	ACUTE OTITIS MEDIA
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	BURN ON EAR-UNSUPERVISED AT HOME
[illegible]	DENTAL
[illegible]	DENTAL - EARS - HIGH PEP
[illegible]	NUTRITION
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	EARS
[illegible]	DENTAL
[illegible]	VISION - NUTRITION
[illegible]	MEDICAL
[illegible]	HIGH PEP
[illegible]	DENTAL
[illegible]	DENTAL

[a] See Table 3A-7 for the syntax of the ID number.

[b] Sample A is the randomly assigned longitudinal sample. Sample V is the randomly assigned attrition sample which was pretested.

Syntax of Six Digit Identification Number

Site Code	Book Code	Pre/Post Code	Case Code
___	___	___	___ ___ ___
A	B	C	D

A = 4 Greene and Humphreys Counties
= 5 St. Clair County
= 6 Maricopa County
= 7 Mingo County

B = 2 Child examination book (constant)

C = 1 Pretest
= 3 Posttest

D = 001 Child Identification number
to 903

Table 3-2

Listing of Children Referred for Urgent Medical Needs Based on the Posttest for Samples A, B, and C[a]

Head Start, Sample A

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	VISION
[illegible]	DENTAL
923194	SPEECH
423103	DENTAL
[illegible]	DENTAL - SPEECH - HEARING - MEDICAL
[illegible]	DENTAL - HEARING
[illegible]	HEARING
[illegible]	DENTAL

Head Start, Sample B

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	VISION
[illegible]	VISION

Head Start, Sample C

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	VISION
[illegible]	VISION
[illegible]	VISION

Non-Head Start, Sample A

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	VISION
[illegible]	HIGH PEP
[illegible]	ENURESIS - PICA-NO LEAD TEST
[illegible]	DENTAL - HYPERACTIVE - CYST ON PENIS - TB EXPOSURE - MEDICAL
[illegible]	DENTAL - HEARING
[illegible]	DENTAL - SPEECH
[illegible]	SPEECH
[illegible]	DENTAL
[illegible]	DENTAL

Non-Head Start, Sample B

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	VISION
[illegible]	HEARING
[illegible]	DENTAL
[illegible]	VISION

Non-Head Start, Sample C

ID Number	Health Problem
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	DENTAL
[illegible]	HIGH PEP
[illegible]	HIGH PEP

---

[a] See Table 2A-7 for the syntax of the ID number.

[b] Sample A is the longitudinal sample. Sample B is randomly assigned posttest only sample. Sample C is the non-randomly assigned posttest only sample.

Table 3-3

Characteristics of Types of Pediatric Problems (Excluding Pica) Reported at Pretest Across All Sites

Characteristic of Problem		Pretested Children (Samples A & D)					
		Organic		Psychosocial		Other Possible Problems	
		HS n=215	NHS n=161	HS n=215	NHS n=161	HS n=215	NHS n=161
Number of Problems		76	57	18	7	0	4
Infectious Problem:							
Yes	n %	35/76 46	20/57 35				2/4 50
No	n %	41/76 54	37/57 65	18/18 100	7/7 100		2/4 50
Chronicity:							
Acute	n %	16/76 21	13/55 24	2/17 12	2/6 33		2/4 50
Acute Exacerbation of Chronic	n %	8/76 11	1/55 2				
Chronic Ongoing	n %	44/76 58	39/55 71	15/17 88	4/6 67		1/4 25
Past Chronic	n %	7/76 9	2/55 4				1/4 25
Problem Resulting from Past Problem	n %	1/76 1					
Severity:							
Mild	n %	41/74 55	38/56 68	8/18 44	2/6 33		1/3 33
Moderate	n %	30/74 41	18/56 32	7/18 39	3/6 50		2/3 67
Severe	n %	3/74 4		3/18 17	1/6 17		
Urgency:							
Attend Within 24 hr	n %	5/76 7	2/57 4				
Future Attention	n %	36/76 4[illegible]	23/57 40	13/17 76	7/7 100		2/4 50
Attend at Routine Visits	n %	35/76 46	32/57 56	4/17 24			2/4 50

Table 3-4

Number of Problems Per Child Identified in the Pediatric Evaluation at Pretest by Gender[a]

Number of Problems Per Child		Pretested Children (Samples A & D) In:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Male n=46	Female n=49	Male n=58	Female n=55	Male n=50	Female n=45	Male n=34	Female n=39
0	n	20	21	26	38	10	18	19	25
	%	43.5	42.9	44.8	69.1	20.0	40.0	55.9	64.1
1	n	19	20	22	12	16	17	11	11
	%	41.3	40.8	37.9	21.8	32.0	37.8	32.4	28.2
2	n	6	6	3	2	19	10	4	3
	%	13.0	12.2	5.2	3.6	38.0	22.2	11.8	7.7
≥ 3	n	1	2	7	3	5	0	0	0
	%	2.2	4.1	12.1	5.5	10.0	0.0	0.0	0.0
Mean		0.76	0.78	0.95	0.45	1.40	0.82	0.56	0.44
S.D.		0.85	0.82	1.23	0.81	0.97	0.78	0.70	0.64
Significance between genders				*		**			

[a] Significance indicated as:
* $p < .05$
** $p < .01$

Table 3-5

Assessment of Child's General Health by the Pediatrician and the Parent Across All Sites

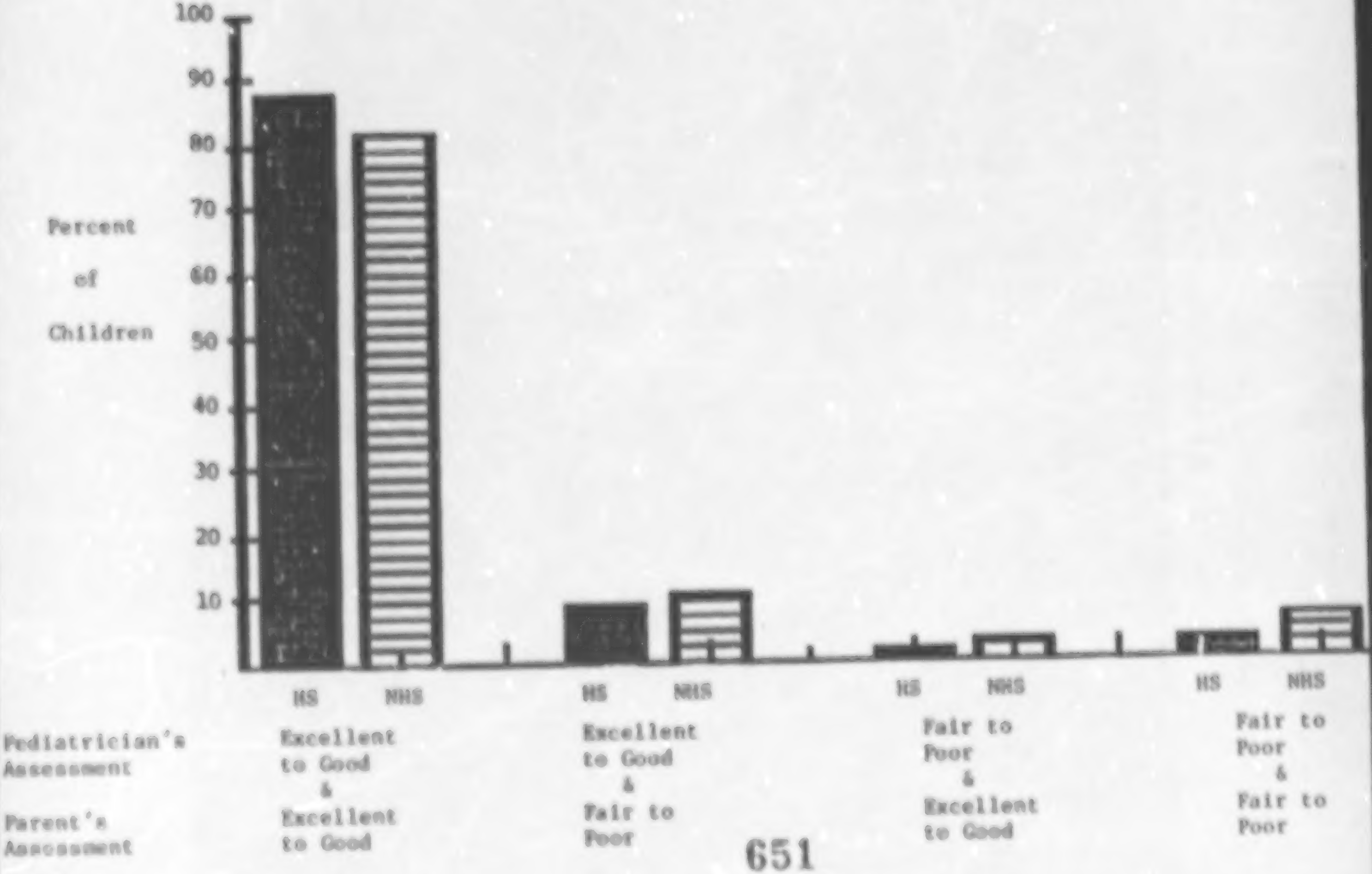

Table 3-6

Assessment of Child's General Health by the
Pediatrician and the Parent in Greene and Humphreys Counties

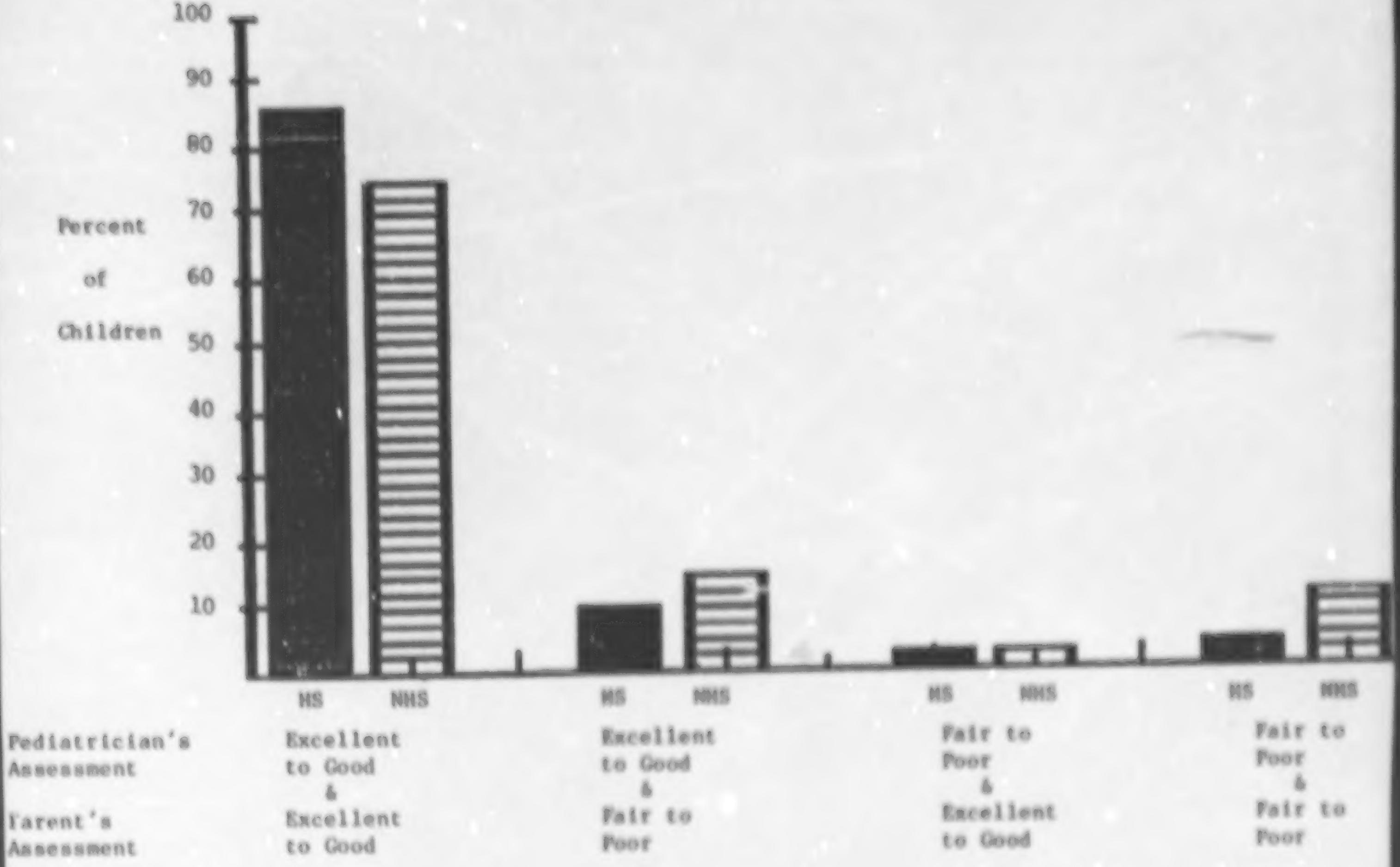

Table 3-7

Assessment of Child's General Health by the Pediatrician and the Parent in St. Clair County

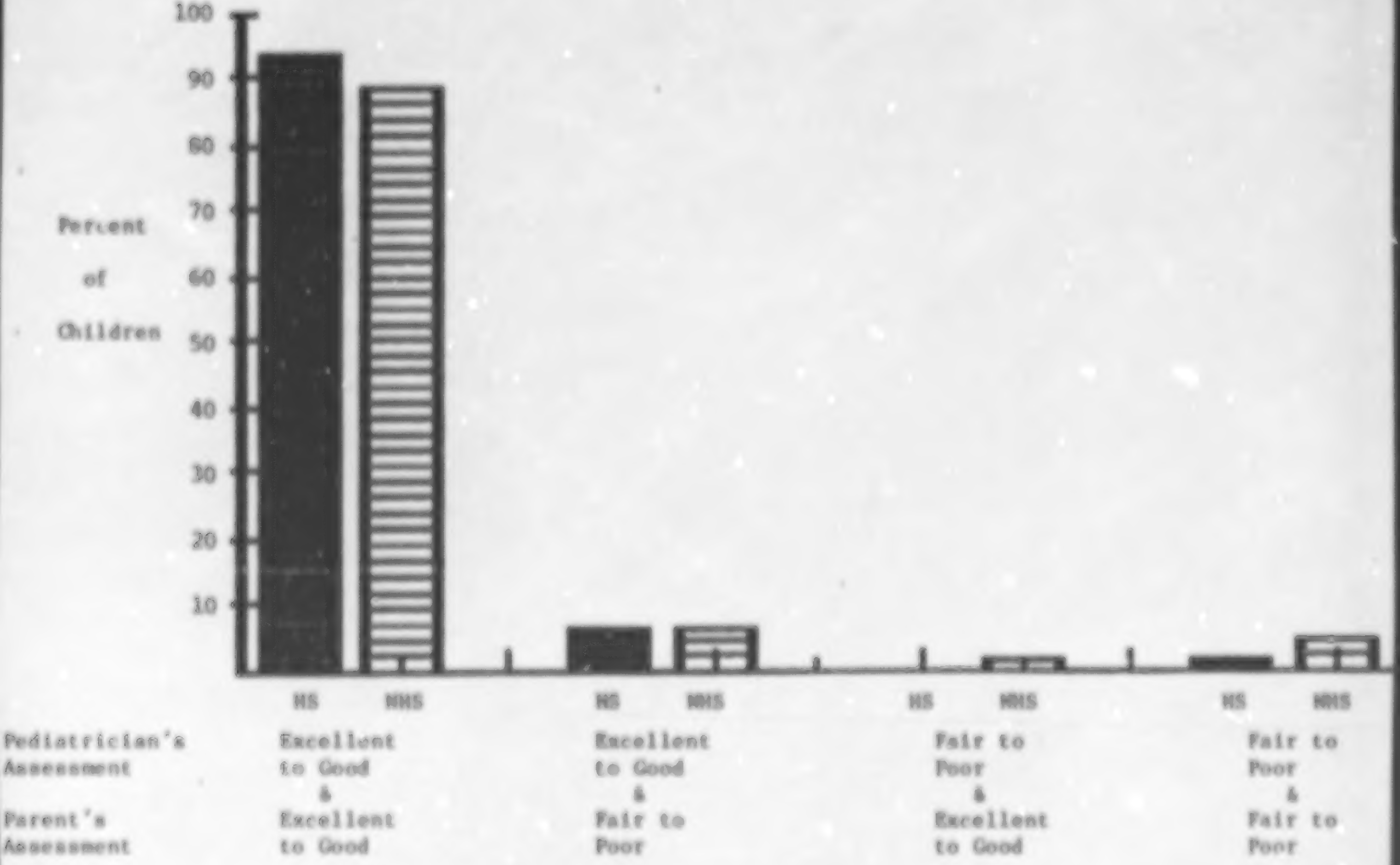

Table 3-8

Assessment of Child's General Health by the Pediatrician and the Parent in Maricopa County

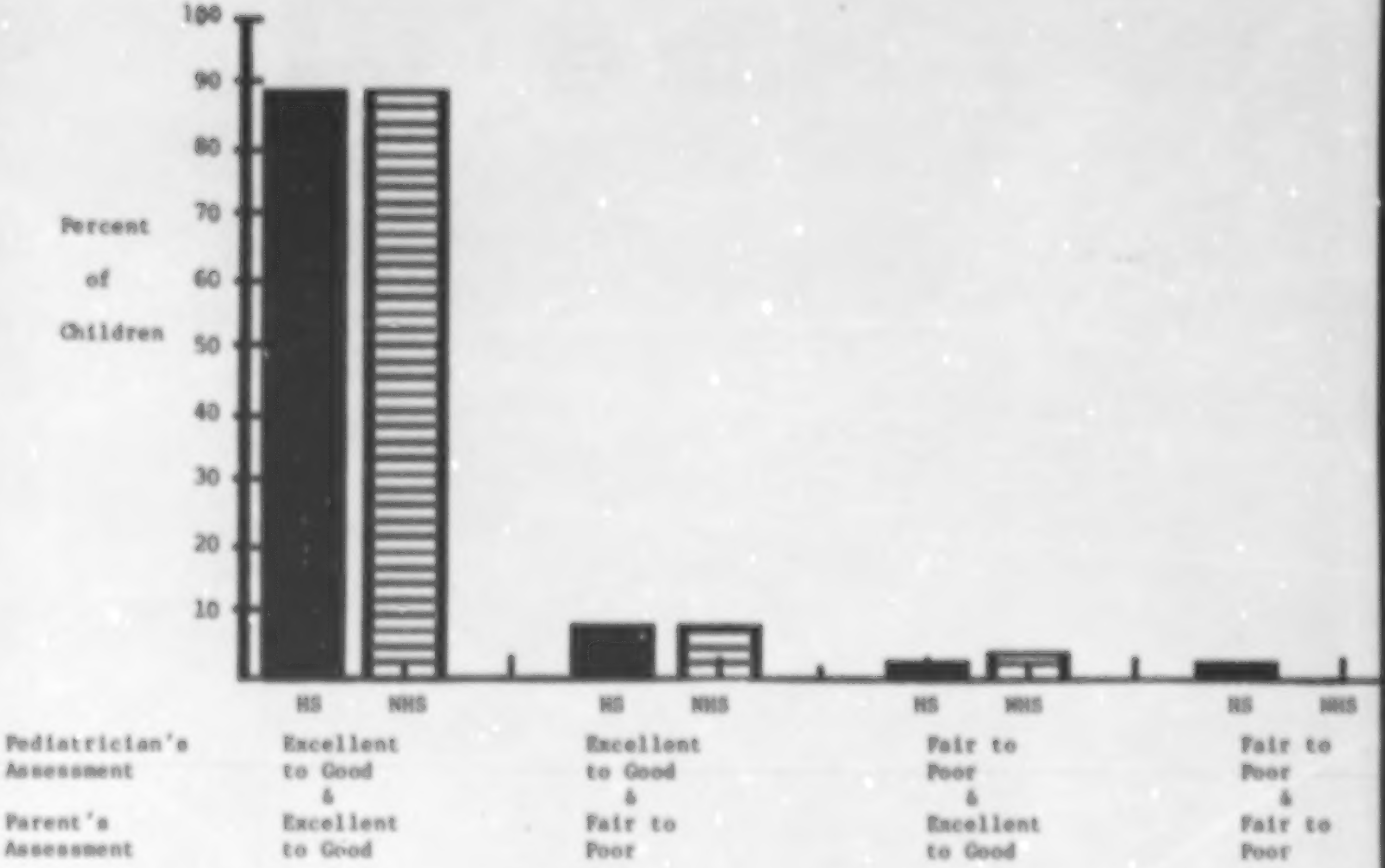

Table 3-9

Assessment of Child's General Health by the Pediatrician and the Parent in Mingo County

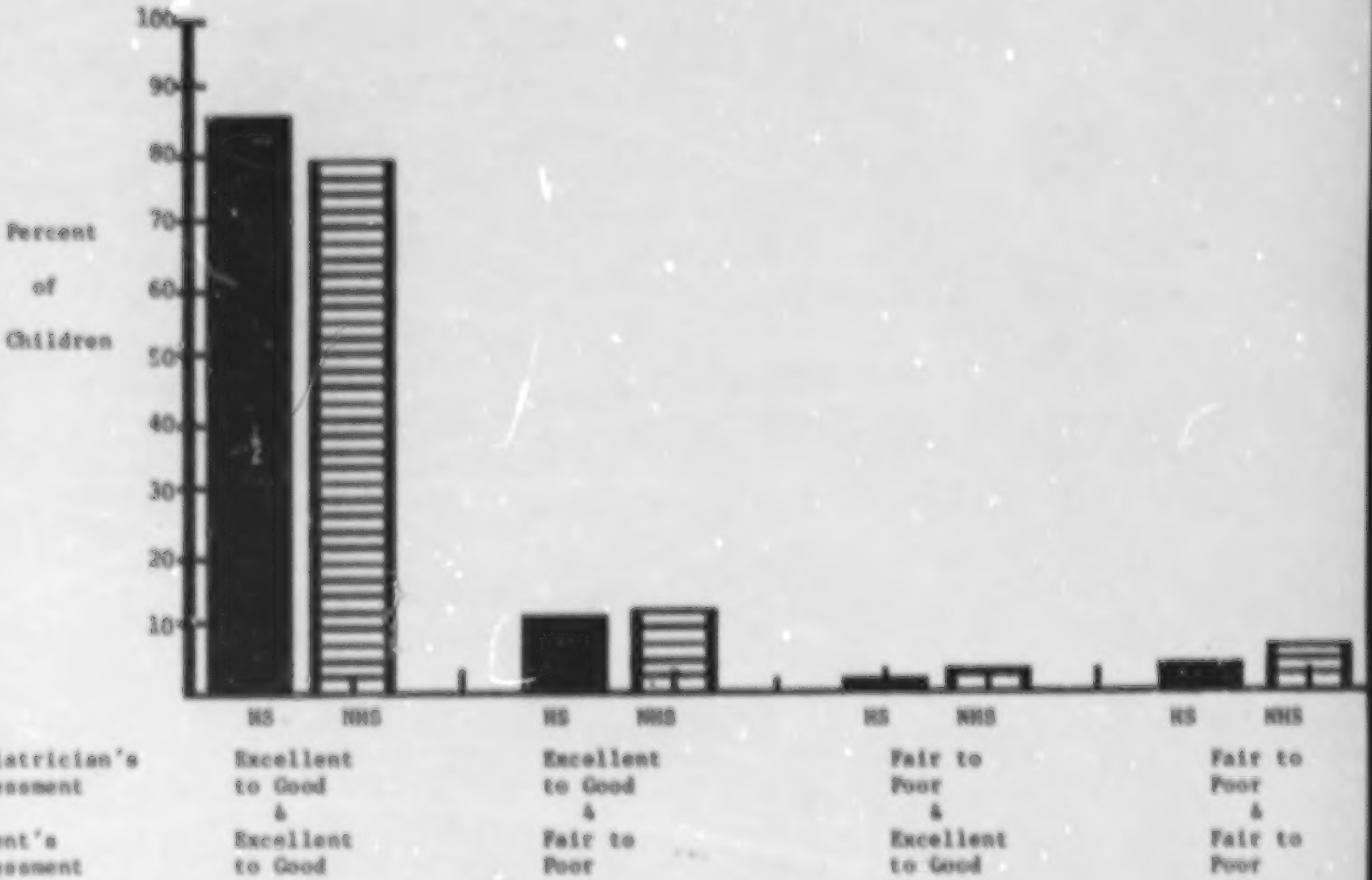

Table 3-10

Mother's Age at Birth of Child

Maternal Age at Birth of Child		Pretested Children (Samples A & D) In:				
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73	All Sites n=376
< 15 years	n	2/92	0/108	2/93	0/72	4/365
	%	2.2	0.0	2.2	0.0	1.1
15-17 years	n	25/92	22/108	10/93	10/72	67/365
	%	27.2	20.4	10.8	13.9	18.4
18-19 years	n	13/92	27/108	14/93	15/72	69/365
	%	14.1	25.0	15.1	20.8	18.9
> 19 years	n	52/92	59/108	67/93	47/72	225/365
	%	56.5	54.6	72.0	65.3	61.6

[a] Source: National Center for Health Statistics: Health United States, 1980. #DHHS Pub. No (PHS) 81-1232, 1980.

Table 3-11

Characteristics of Medical Examination Services for Checkups

Medical Services for Checkups		Posttested Children (Samples A, B & C) In:				
		Greene & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
Providers Used:						
Pediatrician	n	13/224	168/189	38/150	111/203	330/766
	%	5.8	88.9	25.3	54.7	43.1
General Practitioner	n	160/224	12/189	84/150	71/203	327/766
	%	71.4	6.3	56.0	35.0	42.7
Nurse or Nurse Practitioner	n	15/224	2/189	2/150	0	19/766
	%	6.7	1.1	1.3	0.0	2.5
Other Provider	n	5/224	5/189	3/150	4/203	17/766
	%	2.2	2.6	2.0	2.0	2.2
No Provider	n	31/224	2/189	23/150	17/203	73/766
	%	13.8	1.1	15.3	8.4	9.5
Location of Services						
Community clinic	n	31/223	35/189	70/160	40/215	176/787
	%	13.9	18.5	43.8	18.6	22.4
Hospital clinic	n	26/223	4/189	7/160	82/215	119/787
	%	11.7	2.1	4.4	38.1	15.1
Private Physicians office	n	84/223	132/189	31/160	49/215	296/787
	%	37.7	69.8	19.4	22.8	37.6
Health Dept.	n	14/223	3/189	15/160	7/215	52/787
	%	6.3	1.6	9.4	3.3	6.6
Other	n	37/223	13/189	14/160	20/215	84/787
	%	16.6	6.9	8.8	9.3	10.7
No Provider	n	31/223	2/189	23/160	17/215	73/787
	%	13.9	1.1	14.4	7.9	9.3

Table 3-12

Characteristics of Medical Examination Services for Diagnosis and Treatment

Medical Services for Diagnosis and Treatment		Posttested Children (Samples A, B & C) In:				
		Greene & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
Providers Used:						
Pediatrician	n	12/226	170/192	40/151	97/207	319/776
	%	5.3	88.5	26.5	46.9	41.1
General Practitioner	n	177/226	16/192	95/151	88/207	376/776
	%	78.3	8.3	62.9	42.5	48.5
Nurse or Nurse Practitioner	n	6/226	0	2/151	0	8/776
	%	2.7	0.0	1.3	0.0	1.0
Other Provider	n	1/226	4/192	3/151	5/207	13/776
	%	0.4	2.1	2.0	2.4	1.7
No Provider	n	30/226	2/192	11/151	17/207	60/776
	%	13.3	1.0	7.3	8.2	7.7
Location of Services						
Community clinic	n	34/225	31/192	76/166	45/219	186/802
	%	15.1	16.1	45.8	20.5	23.2
Hospital clinic	n	27/225	3/192	9/166	82/219	121/802
	%	12.0	1.6	5.4	37.4	15.1
Private Physicians office	n	94/225	139/192	44/166	54/219	331/802
	%	41.8	72.4	26.5	24.7	41.3
Health Dept.	n	5/225	3/192	11/166	6/219	25/802
	%	2.2	1.6	6.6	2.7	3.1
Other	n	35/225	14/192	15/166	15/219	79/802
	%	15.6	7.3	9.0	6.8	9.8
No Provider	n	30/225	2/192	11/166	17/219	60/802
	%	13.3	1.0	6.7	7.9	7.5

Table 3-13

Characteristics of Medical Services Examination for Immunizations

Medical Services for Immunizations		Posttested Children (Sampes A, B & C) In:				
		Posttested Children (Sampes A, B & C) In:				
		Greens & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
Providers Used:						
Pediatrician	n	2/224	162/185	36/148	49/187	249/744
	%	0.9	87.6	24.3	26.2	33.5
General Practitioner	n	36/224	7/185	84/148	37/187	164/744
	%	16.1	3.8	56.8	19.8	22.0
Nurse or Nurse Practitioner	n	154/224	9/185	15/148	76/187	254/744
	%	68.8	4.9	10.1	40.6	34.1
Other Provider	n	1/224	5/185	2/148	6/187	14/744
	%	0.4	2.7	1.4	3.2	1.9
No Provider	n	31/224	2/185	11/148	19/187	63/744
	%	13.8	1.1	7.4	10.2	8.5
Location of Services						
Community clinic	n	20/224	38/187	82/166	23/219	163/796
	%	8.9	20.3	49.4	10.5	20.5
Hospital clinic	n	11/224	2/187	7/166	34/219	54/796
	%	4.9	1.1	4.2	15.5	6.8
Private Physicians office	n	6/224	123/187	25/166	26/219	180/796
	%	2.7	65.8	15.1	11.9	22.6
Health Dept.	n	152/224	6/187	23/166	99/219	280/796
	%	67.9	3.2	13.9	45.2	35.2
Other	n	4/224	16/187	18/166	18/219	219/796
	%	1.7	8.6	10.8	8.2	27.5
No Provider	n	31/224	2/187	11/166	19/219	63/796
	%	13.8	1.1	6.6	8.7	7.9

Table 3-14

Children with Health Problems at Pretest Who Have Health Problems Existing at Posttest (Excluding All Children Who Were Referred at Pretest for Specific Problems)

Groups of Children		Longitudinal (Sample A Children) Excluding All Children Who Were Referred at Pretest for Specific Problems in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n	7/19	5/11	12/28	2/5	26/63
	%	36.8[a]	45.4	42.9	40.0	41.3
Non-Head Start	n	12/19	4/10	7/42	4/10	27/51
	%	63.2	40.0	58.3	40.0	52.9

Groups of Children		Longitudinal (Sample A Children) Including All Children Referred at Pretest in:				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n	8/25	7/14	14/28	3/6	32/73
	%	32.0[a]	50.0	50.0	50.0	43.8[a]
Non-Head Start	n	12/18	5/7	8/10	4/8	29/43
	%	66.7	71.4	80.0	50.0	67.4

[a] Significant differences between Head Start and non-Head Start groups ($p < .05$).

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Table 3-15

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group, Whether the Problem was Treated, and Whether the Problem was Present at Posttest for Children in Longitudinal Sample in Greene and Humphreys Counties

	Longitudinal Children (Sample A) in:									
	Greene and Humphreys Counties									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Otitis Media										
Acute	1				1					
Serous		3	1				1			2
Recurrent			1		1					
Urinary Tract infection	1				1					1
Asthma	1							2		
Allergy (not asthma)										
Rhinitis	2	1		1	1			4	3	2
Dogs										
Dermatologic										
Eczema	1									
Seborhea										
Nits										
Impetigo										
Dry skin										
Fungal infection										
Infected skin										
Cardiac										
Congenital		1								
Hypertension					1					
Urogenital										
Cyst on penis										
Neurolic										
Seizures					1					
Secondary to head trauma										
Opthalmologic										
Trauma		1								
Strabismus										
Surgical										
Inguinal hernia					1					
Undestended testes		1						2		
Umbilical hernia			1					1		
Ear-Nose-Throat										
Profound tonsillar hypertropia										
Injured tympanic membrane secondary to infection										
TOTAL	6	7	3	1	7		1	9	3	5

Table 3-15

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group, Whether the Problem was Treated, and Whether the Problem was Present at Posttest for Children in Longitudinal Sample in Greene and Humphreys Counties

	Longitudinal Children (Sample A) in:									
	Greene and Humphreys Counties									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Developmental Pattern										
Not toilet trained										
Enuresis	1									
Nutritional										
Obesity										
Growth										
Unspecified								1		
Short stature										
Pica		1	2					4		
Child abuse & neglect										
Psychosocial										
Breath holding			1							
Self-induced vomiting										
Undifferentiated	1	1			1					
Hyperactive										
Depressed mother			1							
Gingival tonsilitis										
TB exposure										
Wardenburg's syndrome				1						
Sickle cell anemia	1									
Congenital abnormality	1									
Pneumonia										
Recurrent										
Failure to thrive										
TOTAL	4	2	4	1	1			5		

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Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group, Whether the Problem was Treated, and Whether the Problem was Present at Posttest for Children in Longitudinal Sample in St. Clair County

	Longitudinal Children (Sample A) in:									
	St. Clair County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Otitis Media										
Acute			1	1						
Serous		2	1	2						
Recurrent										
Urinary Tract Infection										
Asthma				1	1	1				1
Allergy (not asthma)										
Rhinitis										
Dogs			1	1						
Dermatologic										
Exzema										
Seborhea										
Nits										
Impetigo										
Dry skin								1		
Fungal infection										1
Infected skin										1
Cardiac										
Congenital			1							
Hypertension										
Urogenital										
Cyst on penis										
Neurolic										
Seizures						1				
Secondary to head trauma										
Opthalmologic										
Trauma										
Strabismus										1
Surgical										
Inguinal hernia										
Undestended testes										
Umbilical hernia										
Ear-Nose-Throat										
Profound tonsillar hypertropia										
Injured tympanic membrane secondary to infection										
TOTAL		2	3	5	1	2		1		4

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Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group, Whether the Problem was Treated, and Whether the Problem was Present at Posttest for Children in Longitudinal Sample in St. Clair County

	Longitudinal Children (Sample A) in:									
	St. Clair County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Developmental Pattern										
Not toilet trained										1
Enuresis								1		
Nutritional										
Obesity			1							
Growth										
Unspecified										1
Short stature										
Flea			1			1				
Child abuse & neglect	1									
Psychosocial										
Breath holding										1
Self-induced vomiting										
Undifferentiated										
Hyperactive				1						1
Depressed mother										
Gingival tonsilitis										
Tb exposure		1								1
Waardenburg's syndrome										
Sickle cell anemia										1
Congenital abnormality										
Pneumonia										
Recurrent										
Failure to thrive										
TOTAL	1	1	2	1		1		1		6

Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group,
Whether the Problem was Treated, and Whether the Problem was Present at Posttest
for Children in Longitudinal Sample in Maricopa County

	Longitudinal Children (Sample A) in:									
	Maricopa County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Ottitis Media										
Acute										
Serous										
Recurrent		1	1	4				1		2
Urinary Tract Infection										
Asthma				3						1
Allergy (not asthma)										
Rhinitis			1					1		
Dogs										
Dermatologic										
Eczema				1						1
Seborhea		1				1				
Nits										
Impetigo										
Dry skin										
Fungal infection										
Infected skin										
Cardiac										
Congenital				1						
Hypertension										
Urogenital										
Cyst on penis								1		
Neurolic										
Seizures										1
Secondary to head trauma										1
Opthalmologic										
Trauma										
Strabismus										
Surgical										
Inguinal hernia										
Undescended testes										
Umbilical hernia			1							
Ear-Nose-Throat										
Profound tonsillar hypertropia						1	1			
Injured tympanic membrane secondary to infection			2							
TOTAL		2	5	9		2	1	3		6

Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group,
Whether the Problem was Treated, and Whether the Problem was Present at Posttest
for Children in Longitudinal Sample in Maricopa County

	Longitudinal Children (Sample A) in:									
	Maricopa County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Developmental Pattern								1		
Not toilet trained				4						1
Neurosis			1		1			1		
Nutritional										1
Obesity			4					1		
Growth										
Unspecified										
Short stature										1
Pica			1							
Child abuse & neglect										
Psychosocial		2		1						
Breath holding				1						
Self-induced vomiting									1	
Undifferentiated		1								
Hyperactive										
Depressed mother										
Gingival tonsilitis				1						
TB exposure	2	1	2	1		1			1	
Wardenburg's syndrome										
Sickle cell anemia										
Congenital abnormality										
Pneumonia										
Recurrent				1						
Failure to thrive										
TOTAL	2	4	8	9	1	1		3	2	3

Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group,
Whether the Problem was Treated, and Whether the Problem was Present at Posttest
for Children in Longitudinal Sample in Mingo County

	Longitudinal Children (Sample A) in:									
	Mingo County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Otitis Media										
Acute	1						1			2
Serous						1	1			1
Recurrent										
Urinary Tract Infection	1				1	1				1
Asthma					1					
Allergy (not asthma)										
Rhinitis										
Drugs										
Dermatologic								1		
Eczema										
Seborrhea										
Bite										
Impetigo										
Dry skin										
Fungal infection										
Infected skin										
Cardiac										
Congenital	1									
Hypertension										
Urogenital										
Cyst on penis										
Neurolic										
Seizures										
Secondary to head trauma										
Opthalmologic										
Trauma					1					1
Strabismus										
Surgical										
Inguinal hernia		1					1			
Undescended testes										
Umbilical hernia										
Ear-Nose-Throat										
Profound tonsillar hypertrophia										
Injured tympanic membrane secondary to infection										
TOTAL	3	1			3	2	2	1		5

Table 3-15 (continued)

Number of Problems Found at Pretest and Followed-up at Posttest by Head Start and Non-Head Start Group, Whether the Problem was Treated, and Whether the Problem was Present at Posttest for Children in Longitudinal Sample in Mingo County

	Longitudinal Children (Sample A) in:									
	Mingo County									
Head Start-Non Head Start	Head Start					Non-Head Start				
Treatment after Pretest	Yes		No		Unknown	Yes		No		Unknown
Presence at Posttest	Yes	No	Yes	No	Unknown	Yes	No	Yes	No	Unknown
Problem at Pretest										
Developmental Pattern										
Not toilet trained										
Enuresis										
Nutritional										
Obesity										
Growth										
Unspecified						1				
Short stature										
Pica										
Child abuse & neglect										
Psychosocial										
Breath holding										
Self-induced vomiting										
Undifferentiated										
Hyperactive										
Depressed mother										
Gingival tonsillitis										
TB exposure										
Waardenburg's syndrome									1	
Sickle cell anemia										
Congenital abnormality										
Pneumonia										
Recurrent										
Failure to thrive										1
TOTAL						1			1	1

Table 3-16

Children with Problems at Pretest Who Received Treatment for At Least One of Their Problems Prior to Posttest

Groups of Children		Pretested (Sample Children A) in: (Excluding Children Referred at Pretest for Specific Problems)				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n %	12/19 63.2[a]	4/11 36.4	9/28 32.1	3/5 60.0	28/63 44.4
Non-Head Start	n %	2/19 10.5	4/10 40.0	4/12 25.0	5/10 50.0	15/51 29.4

Groups of Children		Pretested (Samples A & D) Children in: (Including All Children Referred at Pretest)				
		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Head Start	n %	13/25 52.0[a]	4/14 28.6	9/21 42.9	4/5 80.0	30/65 46.2
Non-Head Start	n %	2/16 12.5	4/6 66.7	4/8 50.0	5/7 71.4	15/37 40.5

[a] Significant difference between Head Start and non-Head Start group ($p < .05$)

Table 3-17

Number of Medical Problems, Percentage of Children with Single or Multiple Medical Problems Receiving Treatment, by Head Start and Non-Head Start[a]

Treatment of Children Found to Have Medical Problems at Pretest		Longitudinal Children (Sample A) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=43	NHS n=31	HS n=25	NHS n=17	HS n=40	NHS n=16	HS n=18	NHS n=18	HS n=126	NHS n=82
Total Number of Medical Problems at Pretest	n	36	23	17	17	40	21	7	13	100	74
Children Treated for Single Problem	n	8/13	1/15	3/8	2/7	4/16	0/3	3/4	4/7	18/41	7/32
	%	61.5	6.7**	37.5	28.6	25.0	0.0	75.0	57.1	43.9	21.9*
Children Treated for Multiple Medical Problems	n	4/6	1/4	1/3	2/3	5/12	4/9	0/1	1/3	10/22	8/19
	%	66.7	25.0	33.3	66.7	41.7	44.4	0.0	33.3	45.5	42.1

[a] Significant difference between Head Start and non-Head Start indicated as:
*p< .05
**p< .01

Table 3-18

Comparison of Per Capita Incomes of Families With and Without Medicaid Coverage (Sample A)

		Children (Sample A) in: Greene & Humphreys Counties				Children (Sample A) in: St. Clair County				Children (Sample A) in: Mingo County			
		Medicaid		Non-Medicaid		Medicaid		Non-Medicaid		Medicaid		Non-Medicaid	
		Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Head Start	Mean	719	643	1053	1410	806	735	1140	1133	1120	504	827	627
	Min.	281	102	138	321	250	250	875	791	638	178	541	583
	Max.	3125	2100	2812	4500	1375	1083	1583	1812	2250	1250	1687	650
Non-Head Start	Mean	432	390	935	1317	834	865	936	2775	1302	1747	1306	1837
	Min.	27	50	194	187	180	275	347	1650	812	812	650	607
	Max.	937	2100	3150	6750	1583	1312	1650	3375	1687	5500	1916	7000

Table 3-19

Prevalences of Selected Problems from the Pediatric Examination at Posttest[g]

Selected Pediatric Problems		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
Serous Otitis Media	n	9	7	9	11	11	6	9	7	38	31
	%	7.1	6.9	8.3	12.8	10.4	9.8	7.6	6.4	8.3	8.7
Allergies	n	20	10	5	1	9	3	0	0	34	14
	%	15.7	9.9	4.6	1.2	8.5	4.9			7.4	3.9
Asthma	n	13	8	4	2	2	1	1	5	20	16
	%	10.2	7.9	3.7	2.3	1.9	1.6	0.8	4.6	4.3	4.5
All Chronic Illness[a]	n	13	2	5	7	3	4	3	3	24	16
	%	10.2	2.0	4.6	8.1	2.8	6.6	2.5	2.8	5.2	4.5
Enuresis (+ 4 yrs.)	n	6/85	5/57	2/74	0/48	6/106	4/61	7/89	2/53	21/354	11/219
	%	7.1	8.8	2.7	0.0	5.7	6.6	7.8	3.8	5.9	5.0
Recurrent Otitis Media	n	9	3	4	2	5	0	7	5	25	10
	%	7.1	3.0	3.7	2.3	4.7		5.9	4.6	5.4	2.8
Dermatologic[b]	n	1	0	3	3	6	3	0	2	10	8
	%	0.8		2.8	3.5	5.7	4.9		1.8	2.2	2.2
Surgical Indications[c]	n	9	8	1	2	2	0	0	0	12	10
	%	7.1	7.9	0.9	2.3	1.9				2.6	2.8
Neurologic[d]	n	7	1	1	2	2	2	0	1	10	6
	%	5.5	1.0	0.9	2.3	1.9	3.3		0.9	2.2	1.7
Seizures	n	3	1	1	2	0	1	0	0	4	4
	%	2.4	1.0	0.9	2.3		1.6			0.9	1.1
Febrile Seizures	n	4	0	0	0	1	0	0	1	5	1
	%	3.1				0.9			0.9	1.1	0.3
Psychosocial[e]	n	1	0	4	0	2	3	3	2	10	5
	%	0.8		3.7		1.9	4.9	2.5	1.8	2.2	1.4
Congenital Cardiac[f]	n	4	1	4	3	1	2	3	0	12	6
	%	3.1	1.0	3.7	3.5	0.9	3.3	2.5		2.6	1.7
Urinary Infections	n	6	5	1	0	3	0	5	7	15	12
	%	4.7	5.0	0.9		2.8		4.2	6.4	3.3	3.4
Acute Otitis Media	n	1	2	0	0	0	1	2	0	3	3
	%	0.8	2.0				1.6	1.7		0.7	0.8
Congenital Anomalies	n	1	0	0	1	0	0	0	1	1	2
	%	0.8			1.2				0.9	0.2	0.6
Pica	n	5	7	13	7	2	2	1	1	21	17
	%	3.9	6.9	12.0	8.1	1.9	3.3	0.8	0.9	4.6	4.8
None of the Above Problems	n	62	62	75	65	72	43	84	82	293	252
	%	48.8	61.4	69.4	75.6	67.9	70.5	70.6	75.2	63.7	70.6

[a] All chronic illness: congenital cardiac, urogenital anomaly, hypospadias, seizures, neurological problems secondary to head trauma, febrile seizures, and sickle cell anemia.

[b] Dermatologic problems: eczema, seborrhea, nits, alopecea areata, impetigo, dry skin, and fungal infection.

[c] Surgical problems: inguinal hernias, undescended testes, umbilical hernias, and femoral hernias.

[d] Neurologic problems: seizures, febrile seizures, and neurologic problems secondary to head trauma.

[e] Psychosocial problems: breath holding, self-induced vomiting, hyperactivity, depressed mother, and undifferentiated psychosocial problems.

[f] Congenital cardiac problems: mostly murmurs, thought to be non-functional.

[g] The significance of the X^2 tests between Head Start and non-Head Start groups are $p > .05$—therefore not considered significant.

Table 3-20

Characteristics of Types of Pediatric Problems (Excluding Pica) Reported at Posttest Across All Sites

Characteristic of Problem		Posttested Children (Samples A, B, C)					
		Organic		Psychosocial		Other Possible Problem	
		HS n=460	NHS n=357	HS n=460	NHS n=357	HS n=460	NHS n=357
Number of Problems		200	152	39	35	49	22
Infectious Problem:							
Yes	n	55/200	42/152			9/49	2/22
	%	27.8	27.8			18.4	9.1
No	n	143/200	107/152			38/49	18/22
	%	71.5	70.9			77.6	81.8
Uncertain	n	2/200	2/152			2/49	2/22
	%	1.0	1.3			4.1	9.1
Chronicity:							
Acute	n	30/186	28/145	3/33	2/30	3/45	2/21
	%	16.1	19.3	9.1	6.7	6.7	9.5
Acute Exacerbation of Chronic	n	7/186	6/145		1/30	1/45	1/21
	%	3.8	4.1		3.3	2.2	4.8
Chronic Ongoing	n	143/186	104/145	30/33	27/30	40/45	18/21
	%	76.9	71.7	90.9	90.0	88.9	85.7
Past Chronic, Overcome	n	4/186	6/145			1/45	
	%	2.2	4.1			2.2	
Problem Resulting From Past Insult	n	2/186	1/145				
	%	1.0	1.0				
Severity:							
Mild	n	82/185	56/145	14/33	13/31	28/47	13/21
	%	44.3	38.6	42.4	41.9	59.6	61.9
Moderate	n	100/185	86/145	18/33	16/31	18/47	8/21
	%	54.1	59.3	54.5	51.6	38.3	38.1
Severe	n	3/185	3/145	1/33	2/31	1/47	
	%	1.6	2.1	3.0	6.5	2.1	
Urgency:							
Attend Within 24 hr	n	5/185	10/145	5/33	5/31	1/47	
	%	2.7	6.9	15.1	16.1	2.1	
Future Attention	n	94/185	73/145	14/33	16/31	20/47	12/22
	%	50.8	50.3	42.4	51.6	42.6	54.5
Attend at Routine Visits	n	86/185	62/145	14/33	10/31	26/47	10/22
	%	46.5	42.7	42.4	32.2	55.3	45.4

Exhibit 3-21

Mother's Report of State of Child's Health at Posttest

State of Child's Health		Posttested Children (Samples A, B, C) in:				
		Greene & Humphreys Counties n=227	St. Clair County n=193	Maricopa County n=166	Mingo County n=228	All Sites n=814
Excellent	n	42	31	41	49	163
	%	18.5	16.1	24.7	21.5	20.0
Very Good	n	58	74	63	79	274
	%	25.6	38.3	38.0	34.6	33.7
Good	n	93	75	46	70	284
	%	41.0	38.9	27.7	30.7	34.9
Fair	n	30	13	15	29	87
	%	13.2	6.7	9.0	12.7	10.7
Poor	n	4	0	1	1	6
	%	1.8	0.0	0.6	0.4	0.7

Table 3-22

Mothers Reported Problems During Pregnancy of Posttested Children

Maternal Health Indicators During Pregnancy		Posttested Children (Sample A, B, C) in:				
		Greene & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
First prenatal visit more than three months	n %	47/204 23.0	31/150 20.7	50/149 33.6	54/203 26.6	182/706 25.8
Health problems during pregnancy (other than weight gain)	n %	45/207 21.7	28/153 18.3	43/154 27.9	56/211 26.5	172/725 23.7
Pregnancy weight loss or gain of more than 30 lbs.	n %	44/155 28.4	44/120 36.7	48/123 39.0	75/177 42.4	211/575 36.7

Table 3-23

Perinatal Health Problems of Posttested Children

Perinatal Health Problems		Posttested Children (Sample A, B, C) in:				
		Greene & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
Gestation less than 38 weeks or greater than 42 weeks	n	16/209	22/153	27/150	33/211	98/723
	%	7.7	14.4	18.0	15.6	13.6
Birthweight less than 5.5 pounds or greater than 10 pounds	n	27/203	26/148	26/149	20/208	99/708
	%	13.3	17.6	17.4	9.6	14.0
Hospital stay at birth longer than mothers	n	10/210	22/151	24/152	27/212	83/725
	%	4.8	14.6	15.8	12.7	11.4
Health problems at birth	n	45/207	28/153	43/154	56/211	172/725
	%	21.7	18.3	27.9	26.5	23.7
Congenital problems	n	27/212	14/153	29/153	39/214	109/732
	%	12.7	9.2	19.0	18.2	14.9

Table 3-24

Mother's Age at Birth of Child of Posttested Children

Maternal Health Indicators During Pregnancy		Posttested Children (Sample A, B, C) in:				
		Greene & Humphreys Counties n=227	St. Clair County n=194	Maricopa County n=167	Mingo County n=228	All Sites n=816
< 15 years	n	3/223	1/187	1/166	1/221	6/797
	%	1.3	0.5	0.6	0.5	0.8
15-17 years	n	38/223	37/187	22/166	24/221	121/797
	%	17.0	19.8	13.3	10.9	15.2
18-19 years	n	35/223	46/187	27/166	38/221	146/797
	%	15.7	24.6	16.3	17.2	18.3
> 19 years	n	147/223	103/187	116/166	158/221	524/797
	%	65.9	55.1	69.9	71.5	65.7

Table 3-25

Medicaid Coverage for Head Start and Non-Head Start Children in Sample A With Unadjusted Comparisons Between Head Start and Non-Head Start Groups Within Site

	HEAD START			NON-HEAD START					
	N	n	%	N	n	%	CHI SQ	DF	P
Greene/Humphreys									
Pretest	43	17	39.5	31	14	45.2	0.234	1	0.628
Posttest	43	24	55.8	31	13	41.9	1.388	1	0.239
St.Clair									
Pretest	25	22	88.0	17	14	82.4	0.264	1	0.608
Posttest	25	15	60.0	17	13	76.5	1.235	1	0.266
Maricopa									
Pretest	39	0	0.0	16	0	0.0			
Posttest	40	0	0.0	16	0	0.0			
Mingo									
Pretest	18	8	44.4	18	6	33.3	0.468	1	0.494
Posttest	18	6	33.3	17	4	23.5	0.412	1	0.521

Table 3-25 (continued)

Medicaid Coverage for Head Start and Non-Head Start Children in Samples A,B,C,D With Unadjusted Comparisons Between Head Start and Non-Head Start Groups Within Site

	HEAD START			NON-HEAD START					
	N	n	%	N	n	%	CHI SQ	DF	P
Greene/Humphreys									
Pretest	52	21	40.4	43	19	44.2	0.140	1	0.709
Posttest	126	49	38.9	100	40	40.0	0.029	1	0.865
St.Clair									
Pretest	61	51	83.6	51	44	86.3	0.154	1	0.695
Posttest	107	73	68.2	84	55	65.5	0.161	1	0.688
Maricopa									
Pretest	61	0	0.0	33	0	0.0			
Posttest	106	0	0.0	61	0	0.0			
Mingo									
Pretest	40	14	35.0	33	12	36.4	0.015	1	0.904
Posttest	118	32	27.1	107	14	13.1	6.796	1	0.009

Table 3-26

Comparison of Per Capita Incomes of Families With and Without Medicaid Coverage
(Samples A, D pretest and A, B, C posttest)

		Children (Sample A) in: Greene & Humphreys Counties				Children (Sample A) in: St. Clair County				Children (Sample A) in: Mingo County			
		Medicaid		Non-Medicaid		Medicaid		Non-Medicaid		Medicaid		Non-Medicaid	
		Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Head Start	Mean	702	610	1116	1112	830	821	894	1748	938	733	1178	1537
	Min.	281	50	137	50	250	93	479	607	541	178	62	104
	Max.	3125	2100	4312	5250	1625	1875	1583	7000	2250	1650	1687	5500
Non-Head Start	Mean	537	541	895	1243	873	824	994	1881	718	787	1236	2435
	Min.	27	50	41	35	35	250	347	450	325	250	41	187
	Max.	1950	2100	3150	6750	1812	1650	1650	4500	1687	1583	1916	7000

Table 3-27

Percentage of Head Start and Non-Head Start Children Who Have Had Accidents or Been Hospitalized by Site at Posttest

		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS (n=127)	NHS (n=99)	HS (n=108)	NHS (n=86)	HS (n=106)	NHS (n=61)	HS (n=118)	NHS (n=109)	HS (n=459)	NHS (n=355)
Had Accident	n	36	33	46	29	46	31	38	40	166	133
	%	28.3	33.3	42.5	33.7	43.3	50.8	32.2	36.7	36.2	37.5
Hospitalization:											
- Serious Accident	n	8	5	6	10	4	6	2	1	20	22
	%	6.3	5.0	15.6	11.6	3.8	9.8	1.7	1.0	4.4	6.2
- Surgery	n	1	5	10	5	4	3	8	10	24	23
	%	1.0	5.0	9.2	5.8	3.8	4.9	6.8	9.1	5.2	6.5

Table 3-28

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE PHYSICAL EXAM SCREENS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	89	32	4	97	93	5	78	2
	n	66	24	2	82	55	4	48	2
	%	74.2	75.0	50.0	84.5	59.1	80.0	61.5	100.0
		CHI SQ = 0.009 DF = 1 P = 0.925		CHI SQ = 3.273 DF = 1 P = 0.070		CHI SQ = 0.862 DF = 1 P = 0.353		CHI SQ = 1.231 DF = 1 P = 0.267	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	94	33	4	104	97	5	82	3
	n	46	16	3	39	51	4	44	1
	%	48.9	48.5	75.0	37.5	52.6	80.0	53.7	33.3
		CHI SQ = 0.002 DF = 1 P = 0.964		CHI SQ = 2.279 DF = 1 P = 0.131		CHI SQ = 1.439 DF = 1 P = 0.230		CHI SQ = 0.480 DF = 1 P = 0.488	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	92	33	4	101	96	5	81	3
	n	14	7	1	22	16	0	13	0
	%	15.2	21.2	25.0	21.8	16.7	0.0	16.0	0.0
		CHI SQ = 0.624 DF = 1 P = 0.429		CHI SQ = 0.023 DF = 1 P = 0.879		CHI SQ = 0.990 DF = 1 P = 0.320		CHI SQ = 0.570 DF = 1 P = 0.450	

Table 3-28 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE PHYSICAL EXAM SCREENS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	82	31	4	102	95	5	78	3
	n	33	8	1	18	69	3	30	3
	%	40.2	25.8	25.0	17.6	72.6	60.0	38.5	100.0
		CHI SQ = 2.028 DF = 1 P = 0.154		CHI SQ = 0.141 DF = 1 P = 0.707		CHI SQ = 0.376 DF = 1 P = 0.540		CHI SQ = 4.531 DF = 1 P = 0.033	
NO MEDICAID INSURANCE	N	93	33	4	103	97	5	81	3
	n	60	17	2	32	97	5	58	3
	%	64.5	51.5	50.0	31.1	100.0	100.0	71.6	100.0
		CHI SQ = 1.732 DF = 1 P = 0.188		CHI SQ = 0.637 DF = 1 P = 0.425				CHI SQ = 1.173 DF = 1 P = 0.279	
DIFFICULT ACCESS TO MEDICAL CARE	N	94	33	4	104	96	5	79	3
	n	20	6	0	4	20	1	19	2
	%	21.3	18.2	0.0	3.8	20.8	20.0	24.1	66.7
		CHI SQ = 0.144 DF = 1 P = 0.705		CHI SQ = 0.160 DF = 1 P = 0.689		CHI SQ = 0.002 DF = 1 P = 0.964		CHI SQ = 2.755 DF = 1 P = 0.097	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	90	32	3	99	95	5	73	3
	n	8	2	0	1	13	1	10	2
	%	8.9	6.3	0.0	1.0	13.7	20.0	13.7	66.7
		CHI SQ = 0.213 DF = 1 P = 0.640		CHI SQ = 0.031 DF = 1 P = 0.861		CHI SQ = 0.157 DF = 1 P = 0.692		CHI SQ = 6.080 DF = 1 P = 0.014	

Table 3-29

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE PHYSICAL EXAM FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

FINDINGS		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	43	46	0	4	31	62	13	65
	n	29	37	0	2	20	35	10	38
	%	67.4	80.4	0.0	50.0	64.5	56.5	76.9	58.5
		CHI SQ = 1.958 DF = 1 P = 0.162				CHI SQ = 0.556 DF = 1 P = 0.456		CHI SQ = 1.560 DF = 1 P = 0.212	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	45	49	0	4	32	65	13	69
	n	16	30	0	3	18	33	7	37
	%	35.6	61.2	0.0	75.0	56.3	50.8	53.8	53.6
		CHI SQ = 6.185 DF = 1 P = 0.013				CHI SQ = 0.258 DF = 1 P = 0.611		CHI SQ = 0.000 DF = 1 P = 0.988	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	44	48	0	4	31	65	13	68
	n	5	9	0	1	7	9	1	12
	%	11.4	18.8	0.0	25.0	22.6	13.8	7.7	17.6
		CHI SQ = 0.971 DF = 1 P = 0.324				CHI SQ = 1.153 DF = 1 P = 0.283		CHI SQ = 0.803 DF = 1 P = 0.370	

Table 3-30

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Minge	
REFERRAL		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	34	51	0	4	18	75	25	52
	n	23	40	0	2	11	44	16	31
	%	67.6	78.4	0.0	50.0	61.1	58.7	64.0	59.6
		CHI SQ = 1.237 DF = 1 P = 0.266				CHI SQ = 0.036 DF = 1 P = 0.850		CHI SQ = 0.136 DF = 1 P = 0.712	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	36	54	0	4	18	79	25	56
	n	17	27	0	3	12	39	10	34
	%	47.2	50.0	0.0	75.0	66.7	49.4	40.0	60.7
		CHI SQ = 0.067 DF = 1 P = 0.796				CHI SQ = 1.760 DF = 1 P = 0.185		CHI SQ = 2.989 DF = 1 P = 0.084	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	35	53	0	4	17	79	25	55
	n	5	8	0	1	3	13	4	9
	%	14.3	15.1	0.0	25.0	17.6	16.5	16.0	16.4
		CHI SQ = 0.011 DF = 1 P = 0.917				CHI SQ = 0.014 DF = 1 P = 0.905		CHI SQ = 0.002 DF = 1 P = 0.967	

Table 3-30 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT
FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
REFERRAL		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	34	44	0	4	17	78	23	54
	n	12	21	0	1	13	56	7	23
	%	35.3	47.7	0.0	25.0	76.5	71.8	30.4	42.6
		CHI SQ = 1.215 DF = 1 P = 0.270				CHI SQ = 0.154 DF = 1 P = 0.695		CHI SQ = 1.003 DF = 1 P = 0.317	
NO MEDICAID INSURANCE	N	36	53	0	4	18	79	25	55
	n	24	35	0	2	18	79	18	39
	%	66.7	66.0	0.0	50.0	100.0	100.0	72.0	70.9
		CHI SQ = 0.004 DF = 1 P = 0.951						CHI SQ = 0.010 DF = 1 P = 0.920	
DIFFICULT ACCESS TO MEDICAL CARE	N	36	54	0	4	18	78	25	54
	n	5	14	0	0	6	14	6	13
	%	13.9	25.9	0.0	0.0	33.3	17.9	24.0	24.1
		CHI SQ = 1.879 DF = 1 P = 0.170				CHI SQ = 2.099 DF = 1 P = 0.147		CHI SQ = 0.000 DF = 1 P = 0.994	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	36	50	0	3	17	78	22	50
	n	4	4	0	0	1	12	4	6
	%	11.1	8.0	0.0	0.0	5.9	15.4	13.2	12.0
		CHI SQ = 0.240 DF = 1 P = 0.624				CHI SQ = 1.067 DF = 1 P = 0.302		CHI SQ = 0.488 DF = 1 P = 0.485	

Table 3-30 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE PHYSICAL EXAM FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
FINDINGS		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	40	42	0	4	31	64	12	66
	n	17	16	0	1	23	46	4	26
	%	42.5	38.1	0.0	25.0	74.2	71.9	33.3	39.4
		CHI SQ = 0.165 DF = 1 P = 0.684				CHI SQ = 0.036 DF = 1 P = 0.812		CHI SQ = 0.158 DF = 1 P = 0.691	
NO MEDICAID INSURANCE	N	44	49	0	4	32	65	13	68
	n	35	25	0	2	32	65	11	47
	%	79.5	51.0	0.0	50.0	100.0	100.0	84.6	69.1
		CHI SQ = 8.240 DF = 1 P = 0.004						CHI SQ = 1.289 DF = 1 P = 0.256	
DIFFICULT ACCESS TO MEDICAL CARE	N	45	49	0	4	31	65	13	66
	n	8	12	0	0	7	13	3	16
	%	17.8	24.5	0.0	0.0	22.6	20.0	23.1	24.2
		CHI SQ = 0.631 DF = 1 P = 0.427				CHI SQ = 0.085 DF = 1 P = 0.771		CHI SQ = 0.008 DF = 1 P = 0.928	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	44	46	0	3	31	64	12	61
	n	4	4	0	0	5	8	2	8
	%	9.1	8.7	0.0	0.0	16.1	12.5	16.7	13.1
		CHI SQ = 0.004 DF = 1 P = 0.947				CHI SQ = 0.233 DF = 1 P = 0.629		CHI SQ = 0.107 DF = 1 P = 0.744	

Table 3-31

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Prenatal Health Characteristics in All Sites

Prenatal Health Characteristics		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=244	Non-Head Start n=244	Head Start n=211	Non-Head Start n=102
First prenatal visit more than three months	n %	58/205 28.3	57/222 25.7	42/175 24.0	20/91 22.0
Health problems during pregnancy (other than weight gain)	n %	49/209 23.4	53/228 23.2	41/179 22.9	24/95 25.3
Pregnancy weight loss or gain of more than 30 lbs	n %	73/171 42.7	63/178 35.4	46/138 29.7	31/77 40.3

Table 3-31 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Prenatal Health Characteristics in Greene and Humphreys Counties

Prenatal Health Characteristics		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
First prenatal visit more than three months	n %	15/57 26.3	14/53 26.4	10/56 17.9	7/37 18.9
Health problems during pregnancy (other than weight gain)	n %	14/58 24.1	13/54 24.1	8/57 14.0	8/36 22.2
Pregnancy weight loss or gain of more than 30 lbs	n %	19/43 44.2	8/43 18.6	6/40 15.0	10/27 37.0

Table 3-31 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Prenatal Health Characteristics in St. Clair County

Prenatal Health Characteristics		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
First prenatal visit more than three months	n %	9/42 21.4	11/56 19.6	7/35 20.0	4/13 30.8
Health problems during pregnancy (other than weight gain)	n %	6/42 14.3	9/56 16.1	9/36 25.0	3/15 20.0
Pregnancy weight loss or gain of more than 30 lbs	n %	13/34 38.2	15/45 33.3	18/26 69.2	3/11 27.3

Table 3-31 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Prenatal Health Characteristics in Maricopa County

Prenatal Health Characteristics		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
First prenatal visit more than three months	n %	22/62 35.5	14/46 30.4	11/29 37.9	2/10 20.0
Health problems during pregnancy (other than weight gain)	n %	21/63 33.3	11/48 22.9	6/30 20.0	4/11 36.4
Pregnancy weight loss or gain of more than 30 lbs	n %	23/54 42.6	15/35 42.9	8/25 32.0	2/8 25.0

Table 3-31 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Prenatal Health Characteristics in Mingo County

		No Prior Head Start Experience		With Prior Head-Start Experience	
Prenatal Health Characteristics		Head Start n=48	Non-Head Start n=72	Head Start n=68	Non-Head Start n=34
First prenatal visit more than three months	n	12/44	18/67	14/55	7/31
	%	27.3	26.9	25.5	22.6
Health problems during pregnancy (other than weight gain)	n	8/46	20/70	18/56	9/33
	%	17.4	28.6	32.1	27.3
Pregnancy weight loss or gain of more than 30 lbs	n	18/40	25/55	14/47	16/31
	%	45.0	45.5	29.8	51.6

Table 3-32

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Mother's Age at Birth of Child in All Sites

Maternal Age at Birth of Child		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=244	Non-Head Start n=244	Head Start n=211	Non-Head Start n=102
Less than 15 years	n	4/239	2/237	—	—
	%	1.7	0.8		
15 to 17 years	n	51/239	44/237	17/207	6/100
	%	21.3	18.6	8.2	6.0
18 to 19 years	n	45/239	56/237	29/207	11/100
	%	18.8	23.6	14.0	11.0
Greater than 19 years	n	139/239	135/237	161/207	83/100
	%	58.2	57.0	77.8	83.0

Table 3-32 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Mother's Age at Birth of Child in Greene and Humphreys Counties

Maternal Age at Birth of Child		No Prior Head Start Experience		With Prior Head Start Experience	
		head Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
Less than 15 years	n	3/64	—	—	—
	%	4.7			
15 to 17 years	n	14/64	17/58	4/61	3/38
	%	21.9	29.3	6.6	7.9
18 to 19 years	n	9/64	13/58	8/61	4/38
	%	14.1	22.4	13.1	10.5
Greater than 19 years	n	38/64	28/58	49/61	31/38
	%	59.4	48.3	80.3	81.6

Table 3-32 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Mother's Age at Birth of Child in St. Clair County

Maternal Age at Birth of Child		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
Less than 15 years	n	—	1/61	—	—
	%		1.6		
15 to 17 years	n	16/59	12/61	7/46	—
	%	27.1	19.7	15.2	
18 to 19 years	n	14.59	22/61	7/46	3/17
	%	23.7	36.1	15.2	17.6
Greater than 19 years	n	29/59	26/61	32/46	14/17
	%	49.2	42.6	69.6	82.4

Table 3-32 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Mother's Age at Birth of Child in Maricopa County

Maternal Age at Birth of Child		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
Less than 15 years	n	—	1/49	—	—
	%		2.0		
15 to 17 years	n	12/69	6/49	3/35	1/11
	%	17.4	12.2	8.6	9.1
18 to 19 years	n	11/69	10/49	5/35	—
	%	15.9	20.4	14.3	
Greater than 19 years	n	46/69	32/49	27/35	10/11
	%	66.7	65.3	77.1	90.9

Table 3-32 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Mother's Age at Birth of Child in Mingo County

Maternal Age at Birth of Child		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=48	Non-Head Start n=72	Head Start n=68	Non-Head Start n=34
Less than 15 years	n	1/47	—	—	—
	%	2.1			
15 to 17 years	n	9/47	9/69	3/65	2/34
	%	19.1	13.0	4.6	5.9
18 to 19 years	n	11/47	11/69	9/65	4/34
	%	23.4	15.9	13.8	11.8
Greater than 19 years	n	26/47	49/69	53/65	28/34
	%	55.3	71.0	81.5	82.4

Table 3-33

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Perinatal Health Characteristics in All Sites

Perinatal Health Characteristics		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=244	Non-Head Start n=244	Head Start n=211	Non-Head Start n=102
Gestation less than 38 weeks on greater than 42 weeks	n	27/208	33/229	24/176	12/97
	%	13.0	14.4	13.6	12.4
Birthweight less than 5.5 pounds or greater than 10 pounds	n	21/204	27/221	34/176	15/93
	%	10.3	12.2	19.3	16.1
Hospital stay at birth longer than mothers	n	24/208	20/229	29/177	8/97
	%	11.5	8.7	16.4	8.2
Health problems at birth	n	49/209	53/228	41/179	24/95
	%	23.4	23.3	22.9	25.3
Congenital problems	n	33/208	32/230	28/182	12/98
	%	15.9	13.9	15.4	12.2

Table 3-33 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Perinatal Health Characteristics in Greene and Humphreys Counties

Perinatal Health Characteristics		No Prior Head Start Experience		With Prior Head Start Experience	
		Hrad Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
Gestation less than 38 weeks on greater than 42 weeks	n	4/58	3/55	5/56	3/38
	%	6.9	5.5	8.9	7.9
Birthweight less than 5.5 pounds or greater than 10 pounds	n	7/58	4/52	11/55	5/36
	%	12.1	7.7	20.0	13.9
Hospital stay at birth longer than mothers	n	2/58	1/56	5/56	2/38
	%	3.4	1.8	8.9	5.3
Health problems at birth	n	14/58	13/54	8/57	8/36
	%	24.1	24.1	14.0	22.2
Congenital problems	n	9/58	4/57	9/57	3/38
	%	15.5	7.0	15.8	7.9

Table 3-33 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Perinatal Health Characteristics in St. Clair County

Perinatal Health Characteristics		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
Gestation less than 38 weeks on greater than 42 weeks	n %	6/42 14.3	10/56 17.9	6/36 16.7	—
Birthweight less than 5.5 pounds or greater than 10 pounds	n %	6/40 15.0	7/54 13.0	9/35 25.7	3/15 20.0
Hospital stay at birth longer than mothers	n %	8/41 19.5	6/55 10.9	8/35 22.9	—
Health problems at birth	n %	6/42 14.3	9/56 16.1	9/36 25.0	3/15 20.0
Congenital problems	n %	7/41 17.1	3/56 5.4	3/36 8.3	—

Table 3-33 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Perinatal Health Characteristics in Maricopa County

Perinatal Health Characteristics		No Prior Head Start Experience		With Prior Head Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
Gestation less than 38 weeks on greater than 42 weeks	n %	14/62 22.6	6/47 12.8	4/29 13.8	3/11 27.3
Birthweight less than 5.5 pounds or greater than 10 pounds	n %	7/63 11.1	10/45 22.2	7/30 23.3	2/9 22.2
Hospital stay at birth longer than mothers	n %	11/63 17.5	5/47 10.6	5/29 17.2	2/11 18.2
Health problems at birth	n %	21/63 33.3	11/48 22.9	6/30 20.0	4/11 36.4
Congenital problems	n %	12/63 19.0	10/47 21.3	4/30 13.3	3/11 27.3

Table 3-33 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Perinatal Health Characteristics in Mingo County

		No Prior Head Start Experience		With Prior Head Start Experience	
Perinatal Health Characteristics		Head Start n=48	Non-Head Start n=72	Head Start n=68	Non-Head Start n=34
Gestation less than 38 weeks or greater than 42 weeks	n	3/46	14/71	9/55	6/33
	%	6.5	19.7	16.4	18.2
Birthweight less than 5.5 pounds or greater than 10 pounds	n	1/43	6/70	7/56	5/33
	%	2.3	8.6	12.5	15.2
Hospital stay at birth longer than mothers	n	3/46	8/71	11/57	4/32
	%	6.5	11.3	19.3	12.5
Health problems at birth	n	8/46	20/70	18/56	9/33
	%	17.4	28.6	32.1	27.3
Congenital problems	n	5/46	15/70	12/59	6/33
	%	10.9	21.4	20.3	18.2

Table 3-34

Number of Problems Per Child Identified in the Pediatric Evaluation at Posttest by Gender[a]

Number of Problems Per Child		Posttest Children (Samples A, B, C) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Male (n=112)	Female (n=116)	Male (n=104)	Female (n=90)	Male (n=81)	Female (n=86)	Male (n=118)	Female (n=110)
0	n	56	51	54	63	43	46	83	66
	%	50.0	44.0	51.9	70.0	53.1	53.5	70.3	60.0
1	n	41	45	32	16	14	28	28	36
	%	36.6	38.8	30.8	17.8	18.5	32.6	23.7	32.7
2	n	11	12	13	9	14	8	6	5
	%	9.8	10.3	12.5	10.0	17.3	9.3	5.1	4.5
≥ 3	n	4	8	5	2	9	4	1	3
	%	3.6	6.9	4.8	2.2	11.1	4.7	0.8	2.7
Mean		0.67	0.80	0.70	0.44	0.86	0.65	0.36	0.50
S.D.		0.80	0.89	0.87	0.77	1.07	0.84	0.62	0.71
Significance between genders		N.S. (0.6310)		N.S. (0.070)		N.S. (0.059)		N.S. (0.289)	

[a] All statistical tests are nonsignficant.

Table 3-35

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Checkups in Greene & Humphreys Counties

Medical Services for Checkups		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
Providers Used:					
Pediatrician	n	6/65	2/59	3/60	2/38
	%	9.2	3.4	5.0	5.3
General Family	n	49/65	40/59	40/60	29/38
	%	75.4	67.8	66.7	76.3
Nurse	n	1/65	5/59	5/60	4/38
	%	1.5	8.5	8.3	10.5
Other	n	2/65	0	3/60	0
	%	3.1	0.0	5.0	0
No Provider	n	7/65	12/59	9/60	3/38
	%	10.8	20.3	15.0	7.9
Location of Services					
Community clinic	n	7/63	10/59	6/60	6/38
	%	11.1	16.9	10.0	15.8
Hospital clinic	n	9/63	5/59	8/60	4/38
	%	14.3	8.55	13.3	10.5
Private Physicians office	n	29/63	22/59	15/60	17/38
	%	46.0	37.3	25.0	44.7
Health Dept.	n	2/63	4/59	5/60	3/38
	%	3.2	6.8	8.3	7.9
Other	n	9/63	6/59	17/60	5/38
	%	14.3	10.2	28.3	13.2
No Provider	n	7/63	12/59	9/60	3/38
	%	11.1	20.3	15.0	7.9

Table 3-35 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Checkups in St. Clair County

Medical Services for Checkups		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
Providers Used:					
Pediatrician	n	55/60	55/64	37/42	16/18
	%	91.7	85.9	88.1	88.9
General Family	n	3/60	4/64	4/42	1/18
	%	5.0	6.33	9.5	5.6
Nurse	n	0	1/64	1/42	0
	%	0	1.66	2.4	0
Other	n	1/60	3/64	0	1/18
	%	1.7	4.7	0	5.6
No Provider	n	1/60	1/64	0	0
	%	1.7	1.6	0	0
Location of Services					
Community clinic	n	13/60	10/64	5/42	6/18
	%	21.7	15.6	11.9	33.3
Hospital clinic	n	0	4/64	0	0
	%	0	6.3	0	0
Private Physicians office	n	38/60	47/64	32/42	11/18
	%	63.3	73.4	76.2	61.1
Health Dept.	n	2/60	1/64	0	0
	%	3.3	1.6	0	0
Other	n	6/60	1/64	5/42	1/18
	%	10.0	1.6	11.9	5.6
No Provider	n	1/60	1/64	0	0
	%	1.7	1.6	0	0

Table 3-35 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Checkups in Maricopa County

Medical Services for Checkups		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
Providers Used:					
Pediatrician	n	16/61	15/46	4/31	2/10
	%	26.2	32.6	12.9	20.0
General Family	n	37/61	23/46	18/31	5/10
	%	60.7	50.0	58.1	50.0
Nurse	n	0	0	2	0
	%	0	0	6.5	0
Other	n	1/61	0	2/31	0
	%	1.6	0	6.5	0
No Provider	n	7/61	8/46	5/31	3/10
	%	11.5	17.4	16.1	30.0
Location of Services					
Community clinic	n	31/67	17/47	17/35	4/10
	%	46.3	36.2	48.6	40.0
Hospital clinic	n	2/67	2/47	3/35	0
	%	3.0	4.3	8.6	0
Private Physicians office	n	13/67	11/47	5/35	2/10
	%	19.4	23.4	14.3	20.0
Health Dept.	n	9/67	2/47	4/35	0
	%	13.4	4.3	11.4	0
Other	n	5/67	7/47	1/35	1/10
	%	7.5	14.9	2.9	10.0
No Provider	n	7/67	8/47	5/35	3/10
	%	10.4	17.0	14.3	30.0

Table 3-35 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Checkups in Mingo County

Medical Services for Checkups		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=48	Non-Head Start n=72	Head Start n=68	Non-Head Start n=34
Providers Used:					
Pediatrician	n	23/43	39/66	35/62	14/28
	%	53.5	59.1	56.5	50.0
General Family	n	13/43	25/66	19/62	11/28
	%	30.2	37.9	30.6	39.3
Nurse	n	0	0	0	0
	%	0	0	0	0
Other	n	2/43	0	1/62	1/28
	%	4.7	0	1.6	3.6
No Provider	n	5/43	2/66	7/62	2/28
	%	11.6	3.0	11.3	7.1
Location of Services					
Community clinic	n	10/44	9/71	14/62	6/32
	%	22.7	12.7	22.6	18.8
Hospital clinic	n	9/44	32/71	24/62	15/32
	%	20.5	45.1	38.7	46.9
Private Physicians office	n	12/44	15/71	13/62	8/32
	%	27.3	21.1	21.0	25.0
Health Dept.	n	2/44	2/71	3/62	0
	%	4.5	2.8	4.8	0
Other	n	6/44	11/71	1/162	1/32
	%	13.6	15.5	1.6	3.1
No Provider	n	5/44	2/71	7/62	2/32
	%	11.4	2.8	11.3	6.3

Table 3-36

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Diagnosis and Treatment in Greene and Humphreys Counties

Medical Services for Diagnosis and Treatment		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
Providers Used:					
Pediatrician	n	4/66	2/58	4/61	2/39
	%	6.1	3.4	6.6	5.1
General Family	n	55/66	41/58	47/61	32/39
	%	83.3	70.7	77.0	82.1
Nurse	n	1/66	3/58	0	2/39
	%	1.5	5.2	0	5.1
Other	n	0	0	0	1/39
	%	0	0	0	2.6
No Provider	n	6/66	12/58	10/61	2/39
	%	9.1	20.7	16.4	5.1
Location of Services					
Community clinic	n	8/66	10/58	10/61	5/38
	%	12.1	17.2	16.4	13.2
Hospital clinic	n	10/66	5/58	7/61	5/38
	%	15.2	8.6	11.5	13.2
Private Physicians office	n	33/66	22/58	20/61	18/38
	%	50.0	37.9	32.8	47.4
Health Dept.	n	1/66	2/58	0	2/38
	%	1.5	3.44	0	5.3
Other	n	8/66	7/58	14/61	6/38
	%	12.1	12.1	23.0	15.8
No Provider	n	6/66	12/58	10/61	2/38
	%	9.1	20.7	16.4	5.3

Table 3-36 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Diagnosis and Treatment in St. Clair County

Medical Services for Diagnosis and Treatment		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
Providers Used:					
Pediatrician	n	55/60	54/64	40/45	16/18
	%	91.7	84.4	88.9	88.9
General Family	n	4/60	6/64	5/45	1/18
	%	6.7	9.4	11.1	5.6
Nurse	n	0	0	0	0
	%	0	0	0	0
Other	n	0	3/64	0	1/18
	%	0	4.7	0	5.6
No Provider	n	1/60	1/64	0	0
	%	1.7	1.6	0	0
Location of Services					
Community clinic	n	10/60	10/64	4/45	6/18
	%	16.7	15.6	8.9	33.3
Hospital clinic	n	0	3/64	0	0
	%	0	4.7	0	0
Private Physicians office	n	40/60	49/64	35/45	11/18
	%	66.7	76.6	77.8	61.1
Health Dept.	n	3/60	0	0	0
	%	5.0	0	0	0
Other	n	6/60	1/64	6/45	1/18
	%	10.0	1.6	13.3	5.6
No Provider	n	1/60	1/64	0	0
	%	1.7	1.6	0	0

Table 3-36 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Diagnosis and Treatment in Maricopa County

Medical Services for Diagnosis and Treatment		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
Providers Used:					
Pediatrician	n	17/61	14/46	5/31	3/11
	%	27.9	30.4	16.1	27.3
General Family	n	39/61	28/46	20/31	7/11
	%	63.9	60.9	64.5	63.6
Nurse	n	0/61	0	2/31	0
	%	0	0	6.5	0
Other	n	1/61	0	2/31	0
	%	1.6	0	6.5	0
No Provider	n	4/61	4/46	2/31	1/11
	%	6.6	8.7	6.5	9.1
Location of Services					
Community clinic	n	34/69	21/49	16/35	4/11
	%	49.3	42.9	45.7	36.4
Hospital clinic	n	3/69	2/49	3/35	1/11
	%	4.3	4.1	8.6	9.1
Private Physicians office	n	16/69	12/49	11/35	4/11
	%	23.2	24.5	31.4	36.4
Health Dept.	n	7/69	3/49	1/35	0
	%	10.1	6.1	2.9	0
Other	n	5/69	7/49	2/35	1/11
	%	7.2	14.3	5.7	9.1
No Provider	n	4/69	4/49	2/35	1/11
	%	5.8	8.2	5.7	9.1

Table 3-36 (Continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Diagnosis and Treatment in Mingo County

Medical Services for Diagnosis and Treatment		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=48	Non-Head Start n=72	Head Start n=68	Non-Head Start n=34
Providers Used:					
Pediatrician	n	20/45	31/66	33/63	13/29
	%	44.4	47.0	52.4	44.8
General Family	n	17/45	31/66	23/63	14/29
	%	37.8	47.0	36.5	48.3
Nurse	n	0	0	0	0
	%	0	0	0	0
Other	n	3/45	2/66	0	0
	%	6.7	3.0	0	0
No Provider	n	5/45	2/66	7/63	2/29
	%	11.1	3.0	11.1	6.9
Location of Services					
Community clinic	n	10/45	10/72	16/63	8/33
	%	22.2	13.9	25.4	24.2
Hospital clinic	n	10/45	32/72	23/63	15/33
	%	22.2	44.4	36.5	45.5
Private Physicians office	n	14/45	17/72	14/63	8/33
	%	31.1	23.6	22.2	24.2
Health Dept.	n	2/45	1/72	3/63	0
	%	4.4	1.4	4.8	0
Other	n	4/45	10/72	0	0
	%	8.9	13.9	0	0
No Provider	n	5/45	2/72	7/63	2/33
	%	11.1	2.8	11.1	6.1

Table 3-37

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Immunizations in Greene and Humphreys Counties

Medical Services for Immunizations		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=66	Non-Head Start n=59	Head Start n=61	Non-Head Start n=39
Providers Used:					
Pediatrician	n	0	1/59	1/61	0
	%	0	1.7	1.6	0
General Family	n	13/64	6/59	12/61	5/38
	%	20.3	10.2	19.7	13.2
Nurse	n	45/64	40/59	38/61	29/38
	%	70.3	67.8	62.3	76.3
Other	n	0	0	1/61	0
	%	0	0	1.6	0
No Provider	n	6/64	12/59	9/61	4/38
	%	9.4	20.3	14.8	10.5
Location of Services					
Community clinic	n	4/64	4/59	8/60	4/39
	%	6.2	6.8	13.3	10.3
Hospital clinic	n	3/64	2/59	4/60	2/39
	%	4.7	3.4	6.7	5.1
Private Physicians office	n	3/64	1/59	2/60	0
	%	4.7	1.7	3.3	0
Health Dept.	n	48/64	39/59	335/60	28/39
	%	75.0	66.1	58.3	71.8
Other	n	0	1/59	2/60	1/39
	%	0	1.7	3.3	2.6
No Provider	n	6/64	12/59	9/60	4/39
	%	9.4	20.3	15.0	10.3

Table 3-37 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Immunizations in St. Clair County

Medical Services for Immunizations		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=60	Non-Head Start n=64	Head Start n=47	Non-Head Start n=18
Providers Used:					
Pediatrician	n	52/59	51/62	37/41	17/18
	%	88.1	82.3	90.2	94.4
General Family	n	2/59	3/62	2/41	0
	%	3.4	4.8	4.9	0
Nurse	n	4/59	3/62	2/41	0
	%	6.8	4.8	4.9	0
Other	n	0	4/62	0	1/18
	%	0	6.5	0	5.6
No Provider	n	1/59	1/62	0	0
	%	1.7	1.6	0	0
Location of Services					
Community clinic	n	15/60	11/63	5/41	6/18
	%	25.0	17.5	12.2	33.3
Hospital clinic	n	0	2/63	0	0
	%	0	3.2	0	0
Private Physicians office	n	36/60	45/63	228/41	10/18
	%	60.0	71.4	68.3	55.6
Health Dept.	n	4/60	1/63	0	1/18
	%	6.7	1.6	0	5.6
Other	n	4/60	3/63	8/41	1/18
	%	6.7	4.8	19.5	5.6
No Provider	n	1/60	1/63	0	0
	%	1.7	1.6	0	0

Table 3-37 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Immunizations in Maricopa County

Medical Services for Immunizations		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=70	Non-Head Start n=49	Head Start n=35	Non-Head Start n=11
Providers Used:					
Pediatrician	n	16/59	15/46	4/30	1/11
	%	27.1	32.6	13.3	9.1
General Family	n	35/59	24/46	16/30	7/11
	%	59.3	52.2	53.3	63.6
Nurse	n	4/59	3/46	6/30	2/11
	%	6.8	6.4	20.0	18.2
Other	n	0	0	2/30	0
	%	0	0	6.7	0
No Provider	n	4/59	4/46	2/30	1/11
	%	6.8	8.7	6.7	9.1
Location of Services					
Community clinic	n	34/69	22/49	17/35	7/11
	%	49.3	44.9	48.6	63.6
Hospital clinic	n	2/69	2/49	3/35	0
	%	2.9	4.1	8.6	0
Private Physicians office	n	9/69	9/49	5/35	2/11
	%	13.0	18.4	14.3	18.2
Health Dept.	n	13/69	3/49	7/35	0
	%	18.8	6.1	20.0	0
Other	n	7/69	9/49	1/35	1/11
	%	10.1	18.4	2.9	9.1
No Provider	n	4/69	4/49	2/35	1/11
	%	5.8	8.2	5.7	9.1

Table 3-37 (continued)

Percentage of Head Start and Non-Head Start Children By Prior Head Start Experience of Family According to Characteristics of Medical Services for Immunizations in Mingo County

Medical Services for Immunizations		No Prior Head Start Experience		With Prior Head-Start Experience	
		Head Start n=65	Non-Head Start n=59	Head Start n=60	Non-Head Start n=38
Providers Used:					
Pediatrician	n	12/36	23/65	6/54	8/29
	%	33.3	35.4	11.1	27.6
General Family	n	7/36	12/65	12/54	6/29
	%	19.4	18.5	22.2	20.7
Nurse	n	10/36	26/65	27/54	11/29
	%	27.8	40.0	50.0	37.9
Other	n	1/36	2/65	2/54	1/29
	%	2.8	3.1	3.7	3.4
No Provider	n	6/36	2/65	7/54	3/29
	%	16.7	3.1	13.0	10.3
Location of Services					
Community clinic	n	8/43	4/72	9/65	2/33
	%	18.6	5.6	13.8	6.1
Hospital clinic	n	3/43	18/72	4/65	8/33
	%	7.0	25.0	6.2	24.2
Private Physicians office	n	4/43	12/72	5/65	5/33
	%	9.3	16.7	7.7	15.2
Health Dept.	n	17/43	28/72	338/65	13/33
	%	39.5	38.9	58.5	39.4
Other	n	5/43	8/72	2/65	2/33
	%	11.6	11.1	3.1	6.1
No Provider	n	6/43	2/72	7/65	3/33
	%	14.0	2.8	10.8	9.1

CHAPTER FOUR

APPENDIX TABLES

Table 4-1

Children[a] Referred for Urgent Dental Condition Observed at Pretest and Posttest Dental Status

	Pretest			Posttest			
	Number of Decayed Surfaces	Number of Filled Surfaces	Number of Missing Surfaces	Number of Decayed Surfaces	Number of Filled Surfaces	Number of Missing Surfaces	Conclude Treatment Received?
Head Start							
Sample A							
421033	10	0	0	24	13	0	x
421034	25	0	0	23	14	15	x
421055	16	0	0	16	6	0	x
421064	14	0	0	17	7	0	x
421076	22	1	0	28	0	0	
421174	19	0	0	19	0	10	
721076	27	0	0	31	5	5	x
721094	41	0	0	30	6	10	x
721289	27	2	0	73	1	0	x
Head Start							
Sample D							
421191	20	0	0	not posttested			
621149	13	0	0				
621539	24	0	0				
721250	8	0	0				
721257	14	0	20				

[a] System of Six Digit Identification Number

Site Code	Book Code	Pre/Post Code	Case Code
A	B	C	D

A = 4 Greene and Humphreys Counties
= 5 St. Clair County
= 6 Maricopa County
= 7 Mingo County

B = 2 Child examination book (constant)

C = 1 Pretest
= 3 Posttest

D = 001 Child Identification number
to 905

Table 4-1 (continued)

Children[a] Referred for Urgent Dental Condition Observed at Pretest and Posttest Dental Status

	Pretest			Posttest			
	Number of Decayed Surfaces	Number of Filled Surfaces	Number of Missing Surfaces	Number of Decayed Surfaces	Number of Filled Surfaces	Number of Missing Surfaces	Conclude Treatment Received?
Non-Head Start							
Sample A							
621001	19	0	0	14	19	20	x
621019	31	0	0	47	0	0	
621075	16	0	20	19	0	20	
621098	10	0	0	11	1	0	x
621146	a	0	0	13	0	0	
621175	10	0	0	14	0	0	
621192	8	0	0	10	16	0	x
721106	34	0	0	33	0	10	
721297	51	0	0	5	28	30	x
Non-Head Start							
Sample D							
621081	18	0	0	not posttested			
621107	20	0	0				
721029	15	0	0				
721038	34	0	0				
721056	16	1	0				
721057	37	0	0				
721092	7	0	0				
721231	11	1	0				
721252	b	b	b				

[a] Referred for possible pulp necrosis of L-central maxillary incisor.

[b] Child would not cooperate with examiner because of discomfort from numerous caries and other severe dental problems. A precise count of the numbers of problems was not made.

[c] See first page of Table 4-1 for syntax of ID number.

Table 4-2

Prevalence of Affected Surfaces for Children at Pretest by Head Start/Non-Head Start

Percent with Affected Surfaces		Pretested Children (Samples A and D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=50	NHS n=41	HS n=58	NHS n=51	HS n=61	NHS n=33	HS n=40	NHS n=33
Decayed Surfaces	n	38	35	25	27	34	21	23	14
	%	76	83	43	53	56	64	58	42
Filled Surfaces	n	3	3	0	1	8	6	2	5
	%	6	7	0	2	13	18	5	15
Missing Surfaces	n	1	2	4	1	2	4	2	0
	%	2	5	7	2	3	12	5	0

Table 4-3

Average Numbers of Affected Surfaces for Children at Pretest by Head Start/Non-Head Start

Prevalence Variables		Pretested Children (Samples A & D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS n=50	NHS n=41	HS n=58	NHS n=51	HS n=61	NHS n=33	HS n=40	NHS n=33
Decayed Surfaces	$\bar{x}$	6.82	7.41	1.67	3.06	3.89	4.39	6.23	4.55
Filled Surfaces	$\bar{x}$	.42	.12	.00	.16	1.03	3.12	.10	.18
Missing Surfaces	$\bar{x}$	.10	.61	.43	.10	.33	1.06	.63	.00
Dmf	$\bar{x}$	7.32	8.12	2.10	3.31	5.25	8.58	6.95	4.73

Table 4-4

Average Oral Hygiene Index for Head Start and Non-Head Start Children at Pretest

Oral Hygiene Index[a]		Pretested Children (Samples A & D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
	n	50	41	58	51	61	33	40	33
	Mean	1.91	1.97	1.28	1.13	1.19	1.23	1.57	1.64
Standard Deviation		.58	.53	.30	.37	.32	.35	.67	.71
Range	Min.	.38	.50	.00	.00	.38	.38	.00	.00
	Max.	3.00	2.75	1.83	1.67	1.83	1.92	3.00	2.67

[a] Range = 0 (no plaque) to 3 (extensive plaque).

Table 4-5

Classifications of the Profile and Primary Occlusion for Children at Pretest By Head Start/Non-Head Start

Crossbite		Pretested Children (Samples A & D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Profile									
	n	50	39	58	51	60	33	40	33
Straight	%	100	97	98	92	100	100	48	55
Convex	%	-	-	2	4	-	-	48	39
Concave	%	-	3	-	4	-	-	5	6
Right Primary Occlusion									
	n	50	41	59	51	61	33	38	33
Flat	%	4	2	41	55	48	33	42	42
Distal Step	%	4	-	2	8	5	6	3	12
Mesial Step	%	92	98	58	37	48	61	55	46
Left Primary Occlusion									
	n	50	41	59	51	61	33	38	33
Flat	%	4	2	42	45	49	36	40	36
Distal Step	%	4	-	-	4	3	6	3	3
Mesial Step	%	92	98	58	51	48	58	58	61

Table 4-6

Occlusion Measures for Head Start and Non-Head Start Children at Pretest

		Pretested Children (Samples A & D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Degree of Overbite	n	49	40	58	50	57	29	38	32
Openbite	%	8	8	9	12	9	0	8	6
0-5%	%	14	10	22	14	12	17	18	13
5-25%	%	37	45	10	14	23	28	13	9
25-50%	%	25	25	35	24	30	31	26	34
50-75%	%	10	5	16	18	5	17	18	16
75-100%	%	6	8	9	18	21	7	16	22
Size of Overjet	n	48	39	57	49	59	31	33	32
-2-0mm	%	10	3	9	2	5	3	0	0
0-1mm	%	21	13	18	10	22	26	9	9
1-2mm	%	23	33	35	37	31	26	36	19
3mm	%	25	31	23	29	17	26	24	41
4mm	%	13	10	7	12	15	10	9	0
5mm or more	%	8	10	9	10	10	10	21	31
Crossbite	N	48	39	57	52	61	33	38	33
	%	29	15	16	15	3	9	5	12
Presence of Fractured Teeth	N	45	38	57	51	61	33	39	32
	%	18	21	14	12	10	9	21	16

Table 4-7

Urgent Dental Treatment Needs of Children at Pretest by Head Start/Non-Head Start

Urgent Dental Treatment Needs		Pretested Children (Samples A & D) in:							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
Oral Hygiene	n	50	41	58	51	61	33	40	33
	%	2	2	-	2	-	-	25	15
Decay	n	50	41	58	51	61	33	40	33
	%	14	22	9	18	8	18	25	18
Inflammation	n	49	41	58	51	61	33	39	33
	%	2	0	-	4	-	-	18	12
Unacceptable Occlusion	n	50	41	54	48	61	33	39	33
	%	22	15	7	10	-	3	5	9
Any	n	50	41	58	51	61	33	40	33
	%	32	34	17	29	10	21	30	24

Table 4-8

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE DENTAL SCREENS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1285	N	80	37	54	47	98	0	70	12
	n	57	29	41	43	59	0	40	10
	%	71.3	78.4	75.9	91.5	60.2	0.0	57.1	83.3
		CHI SQ = 0.660 DF = 1 P = 0.416		CHI SQ = 4.348 DF = 1 P = 0.037				CHI SQ = 2.953 DF = 1 P = 0.086	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	84	39	58	50	102	0	73	12
	n	38	21	22	20	55	0	42	5
	%	45.2	53.8	37.9	40.0	53.9	0.0	57.5	41.7
		CHI SQ = 0.791 DF = 1 P = 0.374		CHI SQ = 0.048 DF = 1 P = 0.826				CHI SQ = 1.080 DF = 1 P = 0.299	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	83	39	56	49	101	0	72	11
	n	12	9	14	9	16	0	11	2
	%	14.5	23.1	25.0	18.4	15.8	0.0	15.3	18.2
		CHI SQ = 1.383 DF = 1 P = 0.240		CHI SQ = 0.672 DF = 1 P = 0.412				CHI SQ = 0.061 DF = 1 P = 0.805	

Table 4-8 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE DENTAL SCREENS
FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	72	39	57	49	100	0	70	11
	n	26	13	10	9	72	0	27	4
	%	36.1	33.3	17.5	18.4	72.0	0.0	38.6	36.4
		CHI SQ = 0.086 DF = 1 P = 0.770		CHI SQ = 0.012 DF = 1 P = 0.912				CHI SQ = 0.020 DF = 1 P = 0.889	
NO MEDICAID INSURANCE	N	83	39	57	50	102	0	72	12
	n	52	22	19	15	102	0	54	7
	%	62.7	56.4	33.3	30.0	100.0	0.0	75.0	58.3
		CHI SQ = 0.433 DF = 1 P = 0.510		CHI SQ = 0.137 DF = 1 P = 0.712				CHI SQ = 1.437 DF = 1 P = 0.231	
DIFFICULT ACCESS TO MEDICAL CARE	N	84	39	58	50	101	0	71	12
	n	16	8	3	1	21	0	19	3
	%	19.0	20.5	5.2	2.0	20.8	0.0	26.8	25.0
		CHI SQ = 0.036 DF = 1 P = 0.849		CHI SQ = 0.758 DF = 1 P = 0.384				CHI SQ = 0.016 DF = 1 P = 0.898	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	81	37	53	49	100	0	65	11
	n	8	1	0	1	14	0	11	2
	%	9.9	2.7	0.0	2.0	14.0	0.0	16.9	18.2
		CHI SQ = 1.855 DF = 1 P = 0.173		CHI SQ = 1.092 DF = 1 P = 0.296				CHI SQ = 0.011 DF = 1 P = 0.916	

Table 4-9

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE DENTAL FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
FINDINGS		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1200	N	20	60	36	18	90	8	19	51
	n	14	43	30	11	56	3	11	29
	%	70.0	71.7	83.3	61.1	62.2	37.5	57.9	56.9
		CHI SQ = 0.020		CHI SQ = 3.242		CHI SQ = 1.874		CHI SQ = 0.006	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.887		P = 0.072		P = 0.171		P = 0.938	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	22	62	37	21	93	9	19	54
	n	9	29	15	7	51	4	13	29
	%	40.9	46.8	40.5	33.3	54.8	44.4	68.4	53.7
		CHI SQ = 0.225		CHI SQ = 0.296		CHI SQ = 0.357		CHI SQ = 1.246	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.635		P = 0.587		P = 0.550		P = 0.264	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	22	61	36	20	92	9	19	53
	n	3	9	8	6	15	1	3	8
	%	13.6	14.8	22.2	30.0	16.3	11.1	15.8	15.1
		CHI SQ = 0.016		CHI SQ = 0.415		CHI SQ = 0.166		CHI SQ = 0.008	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.898		P = 0.519		P = 0.684		P = 0.942	

Table 4-9 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE DENTAL FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

FINDINGS		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	19	53	37	20	91	9	18	53
	n	6	20	6	4	66	6	8	19
	%	31.6	37.7	16.2	20.0	72.5	66.7	44.4	35.8
		CHI SQ = 0.230 DF = 1 P = 0.632		CHI SQ = 0.128 DF = 1 P = 0.720		CHI SQ = 0.140 DF = 1 P = 0.708		CHI SQ = 0.353 DF = 1 P = 0.553	
NO MEDICAID INSURANCE	N	22	61	37	20	93	9	18	54
	n	16	36	10	9	93	9	15	39
	%	72.7	59.0	27.0	45.0	100.0	100.0	83.3	72.2
		CHI SQ = 1.299 DF = 1 P = 0.254		CHI SQ = 1.887 DF = 1 P = 0.169				CHI SQ = 0.889 DF = 1 P = 0.346	
DIFFICULT ACCESS TO MEDICAL CARE	N	22	62	37	21	92	9	18	53
	n	2	14	2	1	19	2	4	15
	%	9.1	22.6	5.4	4.8	20.7	22.2	22.2	28.3
		CHI SQ = 1.916 DF = 1 P = 0.166		CHI SQ = 0.011 DF = 1 P = 0.915		CHI SQ = 0.012 DF = 1 P = 0.912		CHI SQ = 0.253 DF = 1 P = 0.615	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	22	59	35	18	91	9	17	48
	n	3	5	0	0	13	1	3	8
	%	13.6	8.5	0.0	0.0	14.3	11.1	17.6	16.7
		CHI SQ = 0.480 DF = 1 P = 0.488				CHI SQ = 0.069 DF = 1 P = 0.793		CHI SQ = 0.009 DF = 1 P = 0.926	

Table 4-10

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
REFERRAL		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	17	59	32	22	67	30	35	34
	n	13	41	27	14	43	15	21	18
	%	76.5	69.5	84.4	63.6	64.2	50.0	60.0	52.9
		CHI SQ = 0.313 DF = 1 P = 0.576		CHI SQ = 3.068 DF = 1 P = 0.080		CHI SQ = 1.733 DF = 1 P = 0.188		CHI SQ = 0.350 DF = 1 P = 0.554	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	19	61	33	25	69	32	36	36
	n	10	27	13	9	40	14	25	16
	%	52.6	44.3	39.4	36.0	58.0	43.8	69.4	44.4
		CHI SQ = 0.408 DF = 1 P = 0.523		CHI SQ = 0.070 DF = 1 P = 0.792		CHI SQ = 1.777 DF = 1 P = 0.182		CHI SQ = 4.589 DF = 1 P = 0.032	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	19	59	31	25	68	32	35	36
	n	0	12	7	7	12	4	6	5
	%	0.0	20.3	22.6	28.0	17.6	12.5	17.1	13.9
		CHI SQ = 4.567 DF = 1 P = 0.033		CHI SQ = 0.217 DF = 1 P = 0.641		CHI SQ = 0.429 DF = 1 P = 0.512		CHI SQ = 0.144 DF = 1 P = 0.705	

Table 4-10 (continued)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT
FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
REFERRAL		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	17	50	33	24	67	32	34	35
	n	4	19	3	7	50	21	14	13
	%	23.5	38.0	9.1	29.2	74.6	65.6	41.2	37.1
		CHI SQ = 1.178 DF = 1 P = 0.278		CHI SQ = 3.871 DF = 1 P = 0.049		CHI SQ = 0.865 DF = 1 P = 0.352		CHI SQ = 0.118 DF = 1 P = 0.731	
NO MEDICAID INSURANCE	N	19	57	33	24	69	32	35	36
	n	10	36	7	12	69	32	25	28
	%	52.6	63.2	21.2	50.0	100.0	100.0	71.4	77.8
		CHI SQ = 0.661 DF = 1 P = 0.416		CHI SQ = 5.182 DF = 1 P = 0.023				CHI SQ = 0.378 DF = 1 P = 0.539	
DIFFICULT ACCESS TO MEDICAL CARE	N	19	61	33	25	68	32	34	36
	n	1	17	3	0	14	7	7	12
	%	5.3	27.9	9.1	0.0	20.6	21.9	20.6	33.3
		CHI SQ = 4.246 DF = 1 P = 0.039		CHI SQ = 2.397 DF = 1 P = 0.122		CHI SQ = 0.022 DF = 1 P = 0.883		CHI SQ = 1.436 DF = 1 P = 0.231	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	19	58	32	21	69	30	30	34
	n	3	5	0	0	9	5	4	7
	%	15.8	8.6	0.0	0.0	13.0	16.7	13.3	20.6
		CHI SQ = 0.790 DF = 1 P = 0.374				CHI SQ = 0.226 DF = 1 P = 0.634		CHI SQ = 0.589 DF = 1 P = 0.443	

Table 4-11

Average Numbers of Decayed, Filled, and Missing Surfaces for Children at Pretest by Previous Head Start Experience of Family[a]

Prevalence Variables	Pretested Children (Samples A & D) in:							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience	
	Yes n=56	No n=21	Yes n=25	No n=78	Yes n=28	No n=59	Yes n=22	No n=46
Decayed Surfaces								
$\bar{x}$	7.57	6.76	1.72	2.38	3.79	4.12	6.41	5.45
z[b]	1.17		-1.94*		-.72		1.53	
Filled Surfaces								
$\bar{x}$	.32	.38	.00	.10	1.64	1.69	.27	.09
z[b]	-.40		-1.60		-.17		1.87*	
Missing Surfaces								
$\bar{x}$	.00	1.43	.40	.25	.18	.85	.91	.11
z[b]	-4.00*		.53		-1.64		2.28	
Dmf								
$\bar{x}$	7.88	8.52	2.12	2.74	5.61	6.66	7.59	5.65
z[b]	-.81		-1.39		-1.54		2.69	

[a] Children referred by pretest evaluation are included since their values are prior to subsequent intervention.

[b] Values of z beyond ±1.645 are significant at $p \leq .05$ and shown as (*).

Table 4-12

Average Oral Hygiene Index for Children at Pretest From Families Previously Experienced and Not Experienced in Head Start

Oral Hygiene Index[a]	Pretested Children (Samples A and D)							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience	
	Yes	No	Yes	No	Yes	No	Yes	No
n	56	21	25	78	28	59	22	46
Mean	1.95	2.00	1.13	1.24	1.13	1.23	1.75	1.57
Standard Deviation	.56	.62	.47	.30	.33	.33	.81	.60
Range								
Min.	.38	.83	.00	.00	.58	.58	.00	.00
Max.	3.00	3.00	1.83	1.75	1.75	1.92	3.00	2.58

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[a] Range = 0 (no plaque) to 3 (extensive plaque).

Table 4-13

Urgent Dental Treatment Needs of Children at Pretest from Families Previously Experienced with Head Start

Urgent Dental Treatment Needs		Pretested Children (Samples A & D)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience	
		Yes n=56	No n=21	Yes n=25	No n=78	Yes n=28	No n=59	Yes n=22	No n=46
Oral Hygiene									
	n	2	0	1	0	0	0	6	8
	%	4	0[a]	4	0[a]	0	0	27	17
Decay									
	n	11	5	2	11	3	7	7	8
	%	20	24	8	14	11	12	32	17
Inflammation									
	n	1	0	1	1	0	0	5	6
	%	2	0[a]	4	1[a]	0	0	23	13
Unacceptable occlusion									
	n	13	2	2	8	1	0	1	3
	%	23	10	9	10	2[a]	0[a]	5	7
Any									
	n	20	7	6	18	3	9	7	11
	%	36	33	24	23	11	15	32	24

[a] Insufficient expected values for calculation of chi-squared test.

Table 4-14

Dental History and Care of Teeth According to Mother's Report for Children at Pretest From Families Previously Experienced and Not Previously Experienced with Head Start

Dental History and Care of Teeth		Pretested Children (Samples A & D)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience		Prior Head Start Experience	
		Yes n=56	No n=21	Yes n=26	No n=78	Yes n=27	No n=59	Yes n=22	No n=46
Brushes at Least Once a Day	n	40	13	19	62	14	39	8	28
	%	71	62	73	80	50	66	36	61
Ever Been to Dentist	n	9	2	7	23	6	18	1	1
	%	16	10	27	30	22	31	5	2[a]
Family Visits Dentist Regularly	n	29	12	15	31	9	25	6	9
	%	51	58	56	40	33	43	25	19
Has Dental Insurance	n	28	7	24	77	4	6	4	14
	%	50	33	92	99[a]	15	11	18	30

[a] Insufficient expected values for calculation of chi-squared test.

Table 4-15

Average Number of Decayed, Filled, and Missing Surfaces for Children at Posttest Whose Families Have No Previous Head Start Experience and Were Not Referred for Treatment by Pretest Evaluation

Prevalence Variables	Posttested Children (Samples A & B)							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Head Start		Head Start		Head Start		Head Start	
	HS n=31	NHS n=21	HS n=23	NHS n=34	HS n=29	NHS n=13	HS n=14	NHS n=19
Decayed Surfaces								
$\bar{x}$	11.74	12.29	3.96	3.50	2.59	4.69	4.07	4.63
z^a	-.56		.89		-3.50*		-.76	
Filled Surfaces								
$\bar{x}$	2.68	.19	.00	.18	7.59	5.00	.71	.21
z^a	6.82*		-1.97		2.98*		2.19*	
Missing Surfaces								
$\bar{x}$	.48	.71	.65	.74	.34	2.31	.00	.26
z^a	-.48		-.18		-2.71*		-.85	
Dmf								
$\bar{x}$	14.87	13.14	4.61	4.41	10.41	12.00	4.79	5.11
z^a	1.51		.27		-1.24		-.38	

[a] Values of z beyond ±1.645 are significant at $p \leq .05$ and shown as (*).

Table 4-16

Oral Hygiene Index for Children at Posttest in Samples A and B Whose Families Have No Previous Head Start Experience

Oral Hygiene Index[a]	Posttested Children (Samples A & B)							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Head Start		Head Start		Head Start		Head Start	
	HS	NHS	HS	NHS	HS	NHS	HS	NHS
n	55	49	57	60	65	45	48	68
Mean	1.74	1.92	1.43	1.54[b]	1.42	1.65[b]	1.72	1.73
Standard Deviation	.57	.45	.20	.28	.43	.33	.44	.45
Range								
Min.	.17	.92	1.00	.90	.33	.88	.75	.83
Max.	3.00	2.83	1.83	2.08	2.42	2.42	2.60	2.80

[a] Range = 0 (no plaque) to 3 (extensive plaque).

[b] Significant at $p \leq .05$.

Table 4-17

Urgent Dental Needs of Children for Treatment at Posttest Whose Families Have No Previous Head Start Experience

Prevalence Variables		Posttested Children (Samples A & B)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Head Start		Head Start		Head Start		Head Start	
		HS n=55	NHS n=49	HS n=58	NHS n=61	HS n=67	NHS n=45	HS n=48	NHS n=68
Oral Hygiene									
	n	1	0	2	3	0	0	2	0
	%	2	0[a]	3	5	0	0	4	0[a]
Decay									
	n	3	4	3	5	8	5	12	19
	%	6	8	5	8	12	11	25	28
Inflammation									
	n	2	0	2	4	0	0	6	7
	%	4	0[a]	3	7	0	0	13	10
Unacceptable occlusion									
	n	10	7	4	5	0	0	5	1
	%	18	15	7	9	0	0	11	2[a]
Any									
	n	13	10	7	11	9	5	15	20
	%	24	20	12	18	13	11	31	29

[a] Insufficient expected values for calculation of chi-squared test.

Table 4-18

Dental History and Care of Teeth According to Mother's Report for Children at Posttest in Samples A and B Whose Families Have No Previous Head Start Experience

Prevalence Variables		Posttested Children (Samples A & B)							
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
		Head Start		Head Start		Head Start		Head Start	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
		n=55	n=48	n=58	n=59	n=67	n=45	n=47	n=70
Brushes at Least Once a Day									
	n	43	30	47	47	61	33	34	45
	%	78	63	81	80	91	73[a]	72	64
Ever Been to Dentist									
	n	18	10	47	24	62	21	37	16
	%	33	21	81	41[a]	93	47[a]	78	23[a]
Family Visits Dentist Regularly		n=41	n=40	n=52	n=55	n=60	n=40	n=40	n=61
	n	22	20	36	34	23	13	17	20
	%	54	50	69	62	38	33	43	33
Has Dental Insurance									
	n	28	22	42	39	8	6	13	22
	%	51	45	72	66	12	13	27	31

[a] Chi-squared test is significant at $p \leq .05$.

Table 4-19

Average Number of Decayed, Filled and Missing Surfaces by Fluoridated or Non-Fluoridated Area and Overall at Posttest of Children Not Referred at Pretest[a]

Prevalence Variables		Posttested Children (Samples A, B, C)		
		Non-Fluoridated[b] Area n=214	Fluoridated[c] Areas n=357	Overall n=571
Decayed Surfaces	$\bar{x}$	12.47	3.45	6.54
Filled Surfaces	$\bar{x}$	1.27	2.41	1.62
Missing Surfaces	$\bar{x}$	1.00	.59	.84
Dmf	$\bar{x}$	14.68	6.41	8.96

[a] Mingo County was excluded from these analyses because the largest Head Start community, Williamson, has a fluoridated water supply, unlike other parts of this county.

[b] Non-Fluoridated - Greene and Humphreys Counties, including exception: Fluoridation of community water began in Leakesville, Mississippi at the start of the study year. Approximately 13% of the study children come from Leakesville.

[c] Fluoridated - St. Clair County and Maricopa County

CHAPTER FIVE

APPENDIX TABLES

Table 5-1

Regression Analysis of the Anthropometric Evaluation Measures Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a] b	se(b)
		Site[b]		
HEIGHT	171	Greene & Humphreys	-.093	.133
		St. Clair	d	
		Maricopa	-.022	.115
		Mingo	.114	
		Head Start	-.014	.114
		Constant	-.643	
	Statistics[c]	F = 41.03**	R^2 = .64	MS_e = .475
		Site[b]		
WEIGHT	171	Greene & Humphreys	-.507**	.150
		St. Clair	-.378**	.166
		Maricopa	-.427**	.162
		Mingo	.398	
		Head Start	.163	.091
		Constant	-.904	
	Statistics[c]	F = 99.31**	R^2 = .83	MS_e = .307

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] Effects centered without weights; that is, effects sum to zero.

[c] MS_e is residual mean square.

[d] F is too small for this variable to enter the equation.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a] b	se(b)
		Site[b]		
TRICEPS SKINFOLD	171	Greene & Humphreys	.325	.220
		St. Clair	-.111	.246
		Maricopa	.213	.239
		Mingo	-.427	
		Head Start	-.138	.132
		Constant	1.288	
Statistics[c]		F = 21.24**	R^2 = .51	MS_e = .656
		Site[b]		
ARM CIRCUMFERENCE	171	Greene & Humphreys	.003	.168
		St. Clair	.410*	.190
		Maricopa	-.225	.181
		Mingo	-.188	
		Head Start	-.136	.101
		Constant	.086	
Statistics[c]		F = 50.36**	R^2 = .71	MS_e = .385

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] Effects centered without weights; that is, effects sum to zero.

[c] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors		Effects[a] b	se(b)
		Site[b]			
ESTIMATED MUSCLE CIRCUMFERENCE	171		Greene & Humphreys	-.239	.217
			St. Clair	.342	.225
			Maricopa	-.406	.235
			Mingo	.302	
		Head Start		-.019	.132
		Constant		-.635	

Statistics[c] F = 19.05** R^2 = .48 MS_e = .646

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] Effects centered without weights; that is, effects sum to zero.

[c] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a]		Statistics[b]
			b	se(b)	
		Greene & Humphreys			
HEIGHT	61				
		Head Start	-.173	.159	F = 39.62**
		Constant	-.673		R^2 = .78
					MS_e = .291
		St. Clair			
HEIGHT	32				
		Head Start	.249*	.117	F = 82.39**
		Constant	-.830		R^2 = .92
					MS_e = .077
		Maricopa			
HEIGHT	50				
		Head Start	-.193	.343	F = 6.48**
		Constant	-.368		R^2 = .37
					MS_e = .984
		Mingo			
HEIGHT	28				
		Head Start	.041	.223	F = 25.98**
		Constant	-.171		R^2 = .76
					MS_e = .321

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a]		Statistics[b]
			b	se(b)	
		Greene & Humphreys			
WEIGHT	61				
		Head Start	.225	.157	F = 35.08**
		Constant	-1.479		R^2 = .76
					MS_e = .311
		St. Clair			
WEIGHT	32				
		Head Start	.121	.153	F = 45.39**
		Constant	-.782		R^2 = .87
					MS_e = .139
		Maricopa			
WEIGHT	50				
		Head Start	.123	.183	F = 70.37**
		Constant	.093		R^2 = .86
					MS_e = .275
		Mingo			
WEIGHT	28				
		Head Start	.110	.302	F = 29.62**
		Constant	-.852		R^2 = .84
					MS_e = .577

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a]		Statistics[b]
			b	se(b)	
		Greene & Humphreys			
TRICEPS SKINFOLD	61	Head Start	-.059	.227	F = 7.85**
		Constant	1.466		R^2 = .42
					MS_e = .720
		St. Clair			
TRICEPS SKINFOLD	32	Head Start	-.488*	.226	F = 8.75**
		Constant	-.510		R^2 = .56
					MS_e = .322
		Maricopa			
TRICEPS SKINFOLD	50	Head Start	-.140	.313	F = 14.22**
		Constant	-1.356		R^2 = .62
					MS_e = .790
		Mingo			
TRICEPS SKINFOLD	28	Head Start	-.179	.230	F = 10.21**
		Constant	2.635		R^2 = .64
					MS_e = .352

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

Dependent Variable	Sample Size	Factors	Effects[a]		Statistics[b]
			b	se(b)	
		Greene & Humphreys			
ARM CIRCUMFERENCE	61	Head Start	-.049	.164	F = 27.10**
		Constant	.203		R^2 = .71
					MS_e = .369
		St. Clair			
ARM CIRCUMFERENCE	32	Head Start	-.086*	.220	F = 10.68**
		Constant	-.572		R^2 = .61
					MS_e = .305
		Maricopa			
ARM CIRCUMFERENCE	50	Head Start	.120	.213	F = 23.62**
		Constant	.484		R^2 = .73
					MS_e = .383
		Mingo			
ARM CIRCUMFERENCE	28	Head Start	-.819**	.202	F = 33.07**
		Constant	-.163		R^2 = .85
					MS_e = .274

[a] Adjusted for child's age, race, gender, and pretest z-score.

[b] MS_e is residual mean square.

Table 5-1
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Longitudinal Sample

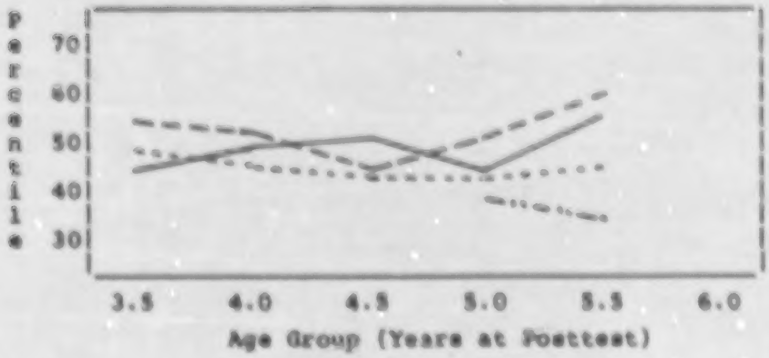
Dependent Variable	Sample Size	Factors	Effects[a] b	se(b)	Statistics[b]
		Greene & Humphreys			
ESTIMATED MUSCLE CIRCUMFERENCE	61	Head Start	.054	.169	F = 18.82**
		Constant	-.460		R^2 = .57
					MS_e = .402
		St. Clair			
ESTIMATED MUSCLE CIRCUMFERENCE	32	Head Start	.244*	.278	F = 9.11**
		Constant	.699		R^2 = .57
					MS_e = .490
		Maricopa			
ESTIMATED MUSCLE CIRCUMFERENCE	30	Head Start	.535	.337	F = 3.53**
		Constant	2.023		R^2 = .29
					MS_e = .910
		Mingo			
ESTIMATED MUSCLE CIRCUMFERENCE	28	Head Start	-.823**	.231	F = 16.74**
		Constant	2.068		R^2 = .74
					MS_e = .354

[a] Adjusted for child's age, race, gender, and pretest z-score.

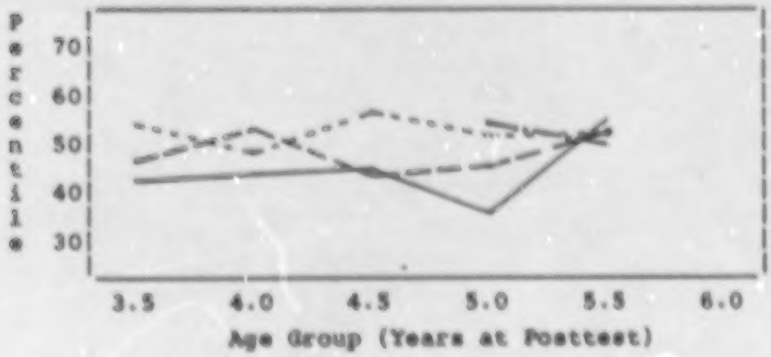
[b] MS_e is residual mean square.

Table 5-2

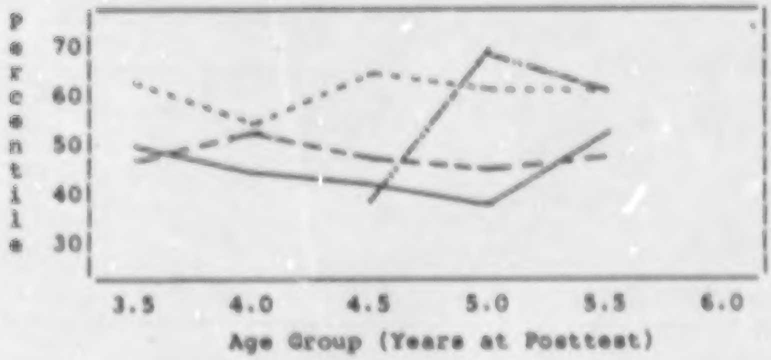
Growth Percentiles for Children by Age Group at Posttest



Height Percentiles



Weight Percentiles

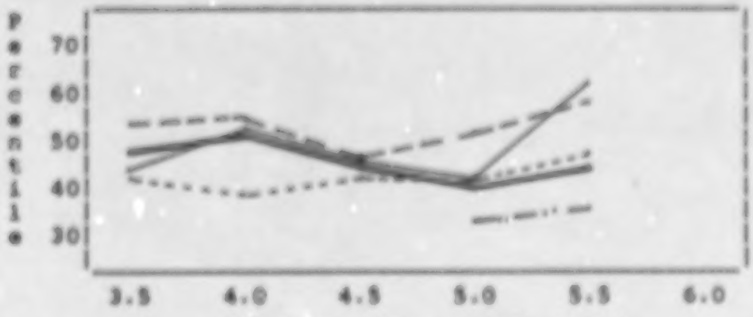


Weight for Height Percentiles

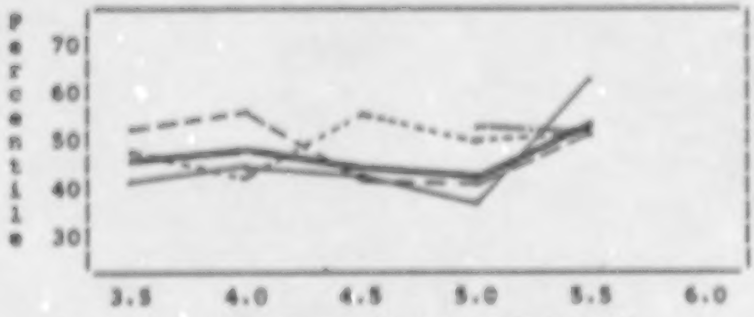
Greene and Humphreys Counties	———
St. Clair County	— —
Maricopa County	—··—
Mingo County	- - - -

Table 5-3

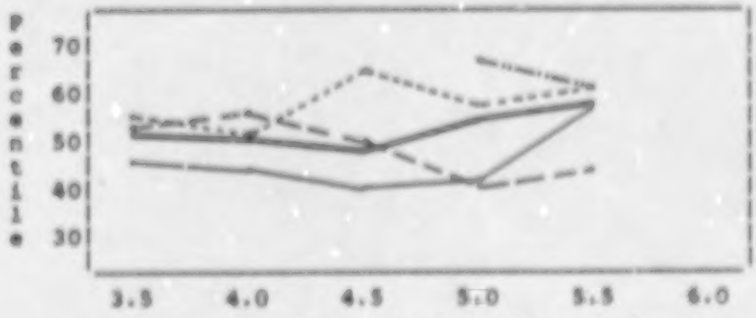
Growth Percentiles for Low Income Children
by Age Group at Posttest



Height Percentiles



Weight Percentiles



Weight for Height Percentiles

Greene and Humphreys Counties	———
St. Clair County	— —
Maricopa County	—·· —
Mingo County	- - - -
All Sites	━━━

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Table 5-4

DISTRIBUTION STATISTICS OF HEAD START AND NON-HEAD START CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEIGHT Z	447	-0.88	-0.09	0.65	-0.20	1.24	350	-0.79	-0.20	0.54	-0.15	1.05	-0.62	0.539
WEIGHT FOR HEIGHT Z	446	-0.51	0.28	1.06	0.34	1.39	349	-0.56	0.08	0.75	0.18	1.34	1.66	0.098
WEIGHT Z	453	-0.75	0.04	0.79	0.07	1.25	350	-0.79	-0.08	0.72	-0.00	1.37	0.81	0.420
TRICEPS SKINFOLD Z	447	-0.48	0.07	0.78	0.24	1.14	338	-0.40	0.07	0.81	0.29	1.12	-0.64	0.521
ARM CIRCUMFERENCE Z	450	-0.82	-0.16	0.55	-0.04	1.11	341	-0.70	-0.04	0.71	0.05	1.11	-1.13	0.259
ESTIMATED MUSCLE CIRCUMFERENCE Z	447	-0.80	-0.23	0.46	-0.21	1.00	335	-0.78	-0.22	0.46	-0.12	0.99	-1.32	0.188
HEIGHT-CM	447	100.55	105.10	109.50	105.23	6.51	350	98.20	102.70	108.00	103.23	6.64	4.26	0.000
WEIGHT-KG	453	15.69	17.33	19.60	17.87	3.24	350	14.97	16.37	18.64	17.03	3.43	3.54	0.000
TRICEPS SKINFOLD-MM	447	8.75	10.25	12.25	10.79	3.33	338	9.00	10.25	12.50	10.97	3.25	-0.78	0.437

Table 5-4 (continued)

DISTIBUTION STATISTICS OF HEAD START AND NON-HEAD START CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES
FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD STALT							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEIGHT Z														
Greene/Humphreys	123	-0.46	0.14	0.77	0.15	1.10	101	-0.95	-0.21	0.60	-0.15	1.11	1.09	0.040
St.Clair	105	-0.49	0.10	0.83	0.13	0.96	82	-0.71	-0.10	0.73	-0.08	1.17	1.31	0.194
Maricopa	101	-2.26	-0.63	0.31	-0.80	1.48	61	-0.95	-0.27	0.26	-0.29	0.92	-3.16	0.002
Mingo	118	-0.92	-0.33	0.48	-0.23	1.10	106	-0.58	-0.20	0.41	-0.10	0.95	-0.97	0.333
WEIGHT FOR HEIGHT Z														
Greene/Humphreys	123	-0.90	-0.09	0.65	-0.13	1.31	101	-0.80	-0.26	0.27	-0.34	1.12	1.29	0.198
St.Clair	104	-0.69	-0.11	0.58	0.06	1.10	82	-0.75	-0.15	0.52	-0.07	0.88	0.93	0.351
Maricopa	101	-0.10	1.00	1.96	1.08	1.70	61	-0.30	0.03	0.66	0.34	1.40	3.01	0.003
Mingo	118	-0.18	0.35	1.06	0.45	1.10	105	-0.04	0.54	1.27	0.70	1.53	-1.89	0.060
WEIGHT Z														
Greene/Humphreys	123	-1.07	0.06	0.77	-0.07	1.28	101	-1.10	-0.56	0.44	-0.41	1.28	1.94	0.054
St.Clair	105	-0.50	-0.14	0.56	0.05	1.17	82	-0.89	-0.18	0.45	-0.18	1.10	1.38	0.168
Maricopa	106	-0.59	0.18	0.95	0.21	1.36	61	-0.83	-0.20	0.78	0.07	1.43	0.62	0.534
Mingo	118	-0.61	0.07	0.81	0.13	1.17	105	-0.28	0.31	1.04	0.48	1.48	-1.99	0.048

Table 3-4 (continued)

DISTRIBUTION STATISTICS OF HEAD START AND NON-HEAD START CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES
FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TRICEPS SKINFOLD Z														
Greene/Humphreys	118	-0.36	0.31	0.88	0.50	1.23	91	-0.25	0.21	0.88	0.46	1.09	0.23	0.817
St.Clair	106	-0.54	-0.06	0.64	0.08	1.12	82	-0.54	-0.10	0.47	-0.03	0.86	0.76	0.448
Maricopa	106	-0.48	0.17	1.04	0.41	1.22	61	-0.25	0.23	1.21	0.67	1.40	-1.20	0.233
Mingo	117	-0.67	-0.13	0.36	-0.04	0.90	105	-0.57	-0.02	0.81	0.17	1.08	-1.57	0.118
ARM CIRCUMFERENCE Z														
Greene/Humphreys	120	-0.52	0.10	0.66	0.18	1.11	97	-0.76	0.02	0.77	0.06	0.99	0.88	0.382
St.Clair	106	-1.01	-0.47	0.45	-0.21	1.12	80	-0.95	-0.37	0.28	-0.36	0.98	0.99	0.322
Maricopa	105	-1.14	-0.50	0.32	-0.32	1.11	60	-0.88	-0.40	0.42	-0.16	1.11	-0.98	0.330
Mingo	116	-0.55	0.03	0.72	0.14	1.04	104	-0.33	0.40	0.86	0.47	1.17	-2.24	0.026
ESTIMATED MUSCLE CIRCUMFERENCE Z														
Greene/Humphreys	118	-0.80	-0.13	0.45	-0.13	1.01	91	-0.79	-0.31	0.24	-0.20	0.87	0.52	0.604
St.Clair	106	-0.97	-0.41	0.23	-0.30	0.90	80	-1.04	-0.36	0.23	-0.38	0.96	0.59	0.557
Maricopa	105	-1.45	-0.68	-0.13	-0.68	1.05	60	-1.14	-0.51	-0.04	-0.64	0.86	-0.25	0.803
Mingo	117	-0.35	0.13	0.78	0.21	0.81	104	-0.25	0.38	0.95	0.46	0.93	-2.13	0.035

Table 5-4 (continued)

DISTIBUTION STATISTICS OF HEADSTART AND NON-HEADSTART CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA

	HEADSTART						NON-HEADSTART							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEIGHT-CM														
Greene/Humphreys	123	101.40	105.80	109.55	105.94	6.60	101	97.20	101.70	106.80	102.31	6.84	4.01	0.000
St.Clair	105	101.20	104.80	109.30	105.19	6.01	82	98.00	101.95	106.90	102.66	6.18	2.81	0.005
Maricopa	101	99.50	106.50	110.10	105.40	6.88	61	104.30	108.50	111.50	108.13	4.36	-3.09	0.002
Mingo	118	100.10	103.70	109.50	104.39	6.49	106	97.00	101.50	106.50	101.74	6.64	3.02	0.003
WEIGHT-KG														
Greene/Humphreys	123	15.19	17.05	19.05	17.35	3.44	101	13.97	15.51	17.69	15.96	2.88	3.29	0.001
St.Clair	105	15.56	16.56	18.37	17.34	2.86	82	14.83	15.93	17.92	16.41	2.57	2.35	0.020
Maricopa	106	16.78	18.82	20.86	19.10	3.27	61	16.33	18.14	20.18	18.73	3.58	0.67	0.501
Mingo	119	15.90	17.33	19.57	17.77	3.04	106	14.97	16.78	19.05	17.54	3.92	0.48	0.628
TRICEPS SKINFOLD-MM														
Greene/Humphreys	118	9.25	11.00	13.25	11.63	3.60	91	9.50	10.75	13.13	11.44	3.14	0.41	0.681
St.Clair	106	8.50	10.00	11.75	10.33	3.14	82	8.50	9.88	11.75	10.06	2.42	0.67	0.503
Maricopa	106	8.50	10.63	13.00	11.23	3.63	61	9.50	10.50	13.25	12.07	4.11	-1.32	0.188
Mingo	117	8.25	9.75	11.25	9.96	2.62	105	8.25	10.00	12.25	10.64	3.12	-1.77	0.078

Table 5-4 (continued)

DISTIBUTION STATISTICS OF HEAD START AND NON-HEAD START CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
HEIGHT Z												
Sample A	73	-0.16	1.12	42	-0.19	1.12	56	-0.49	1.17	35	-0.29	1.00
Sample B	54	0.08	1.15	39	0.09	1.08	11	-0.64	1.67	31	0.02	1.05
Sample C	97	0.10	1.08	106	0.09	1.02	95	-0.66	1.40	158	-0.18	1.03
	F= 1.30	P= 0.276		F= 1.20	P= 0.304		F= 0.01	P= 0.991		F= 0.77	P= 0.466	
WEIGHT FOR HEIGHT Z												
Sample A	73	-0.15	1.08	41	-0.22	0.88	56	0.81	1.62	35	1.12	2.07
Sample B	54	-0.39	1.45	39	0.31	0.94	11	1.42	1.59	31	0.54	1.24
Sample C	97	-0.18	1.21	106	-0.03	1.06	95	0.73	1.64	157	0.51	1.10
	F= 0.65	P= 0.524		F= 2.93	P= 0.056		F= 0.88	P= 0.418		F= 3.14	P= 0.045	
WEIGHT Z												
Sample A	73	-0.28	1.14	41	-0.36	1.05	56	0.16	1.31	35	0.63	1.97
Sample B	54	-0.30	1.59	39	0.23	1.15	11	0.63	1.57	31	0.37	1.32
Sample C	87	-0.14	1.22	107	-0.03	1.15	100	0.11	1.40	159	0.21	1.14
	F= 0.37	P= 0.692		F= 2.76	P= 0.066		F= 0.71	P= 0.494		F= 1.53	P= 0.218	

Table 5-4 (continued)

DISTRIBUTION STATISTICS OF HEAD START AND NON-HEAD START CHILDREN ACCORDING TO AGE- AND SEX- SPECIFIC Z-SCORES FOR SELECTED ANTHROPOMETRY MEASURES RELATIVE TO NCHS REFERENCE DATA WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
TRICEPS SKINFOLD Z												
Sample A	73	0.13	1.08	42	-0.27	0.78	56	0.58	1.36	33	0.27	1.15
Sample B	48	0.48	0.85	39	0.23	1.17	11	0.72	0.71	31	-0.05	0.99
Sample C	88	0.77	1.28	107	0.08	1.01	100	0.43	1.31	156	0.03	0.96
	F= 6.27	P= 0.002		F= 2.84	P= 0.061		F= 0.39	P= 0.676		F= 1.00	P= 0.369	
ARM CIRCUMFERENCE Z												
Sample A	73	-0.02	1.07	41	-0.47	0.87	56	-0.20	1.09	33	0.60	1.23
Sample B	51	0.04	1.15	39	0.01	1.08	11	-0.42	0.96	31	0.19	1.10
Sample C	93	0.30	0.98	106	-0.31	1.11	99	-0.27	1.15	158	0.25	1.09
	F= 2.17	P= 0.117		F= 2.22	P= 0.111		F= 0.19	P= 0.873		F= 1.54	P= 0.216	
ESTIMATED MUSCLE CIRCUMFERENCE Z												
Sample A	73	-0.12	0.91	41	-0.35	1.02	56	-0.68	1.08	32	0.62	1.05
Sample B	48	-0.22	1.18	29	-0.16	0.97	11	-1.01	0.36	31	0.26	0.82
Sample C	88	-0.17	0.86	106	-0.39	0.87	99	-0.62	0.94	158	0.28	0.84
	F= 0.15	P= 0.857		F= 0.86	P= 0.424		F= 0.79	P= 0.453		F= 2.09	P= 0.126	

Table 5-5

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se(b)
		Site[b]		
HEIGHT	770	Greene & Humphreys	.20*	.07
		St. Clair	.19*	.08
		Maricopa	-.41	.09
		Mingo	.02	
		Program		
		Head Start	-.22	.08
		Constant	-.23	
	Statistics[c]	F = 6.93**	R^2 = .06	MS_e = 1.28
		Site[b]		
WEIGHT FOR HEIGHT	770	Greene & Humphreys	-.48**	.08
		St. Clair	-.30**	.09
		Maricopa	.48**	.10
		Mingo	.30	
		Head Start	.14	.09
		Constant	.21	
	Statistics[c]	F = 11.27**	R^2 = .09	MS_e = 1.60

[a] Adjusted for child's age, race, and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se(b)
		Site[b]		
WEIGHT	770	Greene & Humphreys	-.24**	.08
		St. Clair	-.10	.09
		Maricopa	.97	.10
		Mingo	-.63	
		Program		
		Head Start	.58	.09
		Constant	-.23	
Statistics[c]		F = 2.42**	R^2 = .02	MS_e = 1.61
		Site[b]		
TRICEPS SKINFOLD	770	Greene & Humphreys	.29**	.07
		St. Clair	-.13	.08
		Maricopa	.10	.08
		Mingo	-.26	
		Head Start	-.94	.08
		Constant	.18	
Statistics[c]		F = 6.65**	R^2 = .06	MS_e = 1.22

[a] Adjusted for child's age, race, and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se(b)
		Site[b]		
ARM CIRCUMFERENCE	770	Greene & Humphreys	.19**	.07
		St. Clair	-.24	.08
		Maricopa	-.24	.08
		Mingo	.29	
		Program		
		Head Start	-.71	.08
		Constant	.11	
	Statistics[c]	F = 6.04**	R^2 = .05	MS_e = 1.20
		Site[b]		
TRICEPS SKINFOLD	770	Greene & Humphreys	.10	.06
		St. Clair	-.18**	.07
		Maricopa	-.36**	.07
		Mingo	.44	
		Head Start	-.71	.07
		Constant	.30	
	Statistics[c]	F = 16.68**	R^2 = .13	MS_e = .87

[a] Adjusted for child's age, race, and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se(b)	
		Greene & Humphreys			
HEIGHT	209	Head Start	.24	.16	F = 1.34
					R^2 = .03
		Constant	-.26		MS_e = 1.26
		St. Clair			
HEIGHT	184	Head Start	.22	.16	F = 1.90**
					R^2 = .04
		Constant	.58		MS_e = 1.09
		Maricopa			
HEIGHT	161	Head Start	-.60**	.22	F = 2.72**
					R^2 = .07
		Constant	2.69		MS_e = 1.72
		Mingo			
HEIGHT	216	Head Start	-.12	.15	F = .41
					R^2 = .01
		Constant	.42		MS_e = 1.09

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	 se(b)	Statistics[c]
		Greene & Humphreys			
WEIGHT FOR HEIGHT	209	Head Start	.89	.18	F = 1.52
					R^2 = .03
		Constant	-.61		MS_e = 1.46
		St. Clair			
WEIGHT FOR HEIGHT	184	Head Start	.16	.15	F = .44
					R^2 = .01
		Constant	-.56		MS_e = 1.05
		Maricopa			
WEIGHT FOR HEIGHT	161	Head Start	.79**	.26	F = 2.52*
					R^2 = .06
		Constant	.70		MS_e = 2.58
		Mingo			
WEIGHT FOR HEIGHT	216	Head Start	-.36**	.17	F = 1.33
					R^2 = .02
		Constant	.17		MS_e = 1.40

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se(b)	
		Greene & Humphreys			
WEIGHT	209	Head Start	.18	.18	F = 2.27*
					R^2 = .04
		Constant	-.93		MS_e = 1.60
		St. Clair			
WEIGHT	184	Head Start	.25	.17	F = .70
					R^2 = .02
		Constant	-.14		MS_e = 1.33
		Maricopa			
WEIGHT	161	Head Start	.19	.23	F = .64
					R^2 = .02
		Constant	2.12		MS_e = 1.91
		Mingo			
WEIGHT	216	Head Start	-.38**	.18	F = 1.43
					R^2 = .03
		Constant	-.26		MS_e = 1.58

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

Table 3-3
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se(b)	Statistics[c]
		Greene & Humphreys			
TRICEPS SKINFOLD	209	Head Start	.33	.16	F = 8.02**
					R^2 = .14
		Constant	.86		MS_e = 1.21
		St. Clair			
TRICEPS SKINFOLD	184	Head Start	.10	.15	F = .60
					R^2 = .01
		Constant	.35		MS_e = 1.04
		Maricopa			
TRICEPS SKINFOLD	161	Head Start	-.19	.21	F = 1.10
					R^2 = .03
		Constant	1.69		MS_e = 1.70
		Mingo			
TRICEPS SKINFOLD	216	Head Start	-.22	.14	F = 1.00
					R^2 = .02
		Constant	-.27		MS_e = .93

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

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Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se(b)	Statistics[c]
		Greene & Humphreys			
ARM CIRCUMFERENCE	209	Head Start	.87	.04	F = 1.90
					R^2 = .04
		Constant	.58		MS_e = 1.10
		St. Clair			
ARM CIRCUMFERENCE	184	Head Start	.19	.16	F = .92
					R^2 = .02
		Constant	.12		MS_e = 1.14
		Maricopa			
ARM CIRCUMFERENCE	161	Head Start	-.12	.19	F = .62
					R^2 = .02
		Constant	.67		MS_e = 1.27
		Mingo			
ARM CIRCUMFERENCE	216	Head Start	-.34*	.16	F = 1.61
					R^2 = .03
		Constant	.36		MS_e = 1.25

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

Table 5-5
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se(b)	
		Greene & Humphreys			
ESTIMATED MUSCLE CIRCUMFERENCE	209	Head Start	.77	.14	F = .69
					R^2 = .01
		Constant	.26		MS_e = .91
		St. Clair			
ESTIMATED MUSCLE CIRCUMFERENCE	184	Head Start	.14	.16	F = 2.72**
					R^2 = .06
		Constant	-.18		MS_e = .83
		Maricopa			
ESTIMATED MUSCLE CIRCUMFERENCE	161	Head Start			F = .29
					R^2 = .01
		Constant	-.26		MS_e = 1.00
		Mingo			
ESTIMATED MUSCLE CIRCUMFERENCE	216	Head Start	-.22	.13	F = 1.29
					R^2 = .02
		Constant	.60		MS_e = .77

[a] Adjusted for child's age, race, and gender.

[b] Effects centered without weights.

[c] MS_e is residual mean square.

Table 5-6

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
HEIGHT	376	Greene & Humphreys	.20	.15
		St. Clair	.13	.10
		Maricopa	-.36*	.15
		Mingo	.03	.15
		Program		
		Head Start		
		Constant	-.77	
		Statistics F = 9.13** R^2 = .15 MS_e = .93		
		Site		
WEIGHT FOR HEIGHT	376	Greene & Humphreys	-.15	.19
		St. Clair	-.29*	.12
		Maricopa	.25	.18
		Mingo	.19	
		Program		
		Head Start	.82	.13
		Constant	2.93	
		Statistics F = 3.32** R^2 = .07 MS_e = 1.40		

[a] Adjusted for child's age, race and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
WEIGHT	376	Greene & Humphreys	d	
		St. Clair	-.13	.12
		Maricopa	-.49	.15
		Mingo	e	
		Program		
		Head Start	.42	.13
		Constant	-2.87	
		Statistics F = 1.57	R^2 = .02	MS_e = 1.41
		Site		
TRICEPS SKINFOLD	376	Greene & Humphreys	-.13	.16
		St. Clair	-.25	.11
		Maricopa	.36*	.16
		Mingo	.02	
		Program		
		Head Start	-.81	.11
		Constant	2.95	
		Statistics F = 2.97**	R^2 = .06	MS_e = 1.70

[a] Adjusted for child's age, race and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
ARM CIRCUMFERENCE	376	Greene & Humphreys	.17	.17
		St. Clair	-.22	.11
		Maricopa	-.20	.17
		Mingo	.25	
		Program		
		Head Start	-.74	.12
		Constant	.64	
		Statistics F = 2.89** R^2 = .06 MS_e = 1.19		
		Site		
ESTIMATED MUSCLE CIRCUMFERENCE	376	Greene & Humphreys	.29*	.14
		St. Clair	-.22*	.09
		Maricopa	-.52**	.14
		Mingo	.45	
		Program		
		Head Start	-.17	.10
		Constant	-.46	
		Statistics F = 9.17** R^2 = .17 MS_e = .83		

[a] Adjusted for child's age, race and gender.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE$_b$	Statistics[c]
		Greene & Humphreys			
HEIGHT	28				
		Head Start	d		F = .29
					R^2 = .05
		Constant	2.69		MS_e = .96
		St. Clair			
HEIGHT	147				
		Head Start	.65	.16	F = 5.44**
					R^2 = .16
		Constant	-8.42		MS_e = .93
		Maricopa			
HEIGHT	37				
		Head Start	d		F = .13
					R^2 = .01
		Constant	.80		MS_e = 1.50
		Mingo			
HEIGHT	164				
		Head Start	-.11	.15	F = 5.98**
					R^2 = .16
		Constant	-9.24		MS_e = .80

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

[d] F too small for this variable to enter the equation.

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
WEIGHT FOR HEIGHT	28	Head Start	.88	.48	F = .88
					R^2 = .17
		Constant	4.74		MS_e = .85
		St. Clair			
WEIGHT FOR HEIGHT	147	Head Start	.11	.18	F = .20
					R^2 = .01
		Constant	1.66		MS_e = 1.06
		Maricopa			
WEIGHT FOR HEIGHT	37	Head Start	.36	.66	F = 2.41*
					R^2 = .23
		Constant	25.31		MS_e = 2.78
		Mingo			
WEIGHT FOR HEIGHT	164	Head Start	-.30	.20	F = 1.05
					R^2 = .03
		Constant	2.04		MS_e = 1.41

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
WEIGHT	28				
		Head Start	.63	.49	F = .53
		Constant	4.30		MS_e = .91
		St. Clair			
WEIGHT	147				
		Head Start	.12	.20	F = 1.03
		Constant	-4.18		MS_e = 1.32
		Maricopa			
WEIGHT	37				
		Head Start	.30	.52	F = 2.70*
		Constant	18.02		MS_e = 1.74
		Mingo			
WEIGHT	164				
		Head Start	-.33	.20	F = 1.88
		Constant	-4.24		MS_e = 1.43

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures
Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] SE_b	Statistics[c]
		Greene & Humphreys			
TRICEPS SKINFOLD	28	Head Start	-.47	.58	F = 1.80
		Constant	1.09		MS_e = 1.24
		St. Clair			
TRICEPS SKINFOLD	147	Head Start	.10	.17	F = .80
		Constant	3.49		MS_e = 1.00
		Maricopa			
TRICEPS SKINFOLD	37	Head Start	-.65	.51	F = 1.95
		Constant	21.04		MS_e = 1.70
		Mingo			
TRICEPS SKINFOLD	164	Head Start	-.14	.16	F = .97
		Constant	1.40		MS_e = .91

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
ARM CIRCUMFERENCE	28	Head Start	.39	.51	F = 1.84
					R^2 = .29
		Constant	6.66		MS_e = .96
		St. Clair			
ARM CIRCUMFERENCE	147	Head Start	.46	.18	F = .19
					R^2 = .01
		Constant	.38		MS_e = 1.18
		Maricopa			
ARM CIRCUMFERENCE	37	Head Start	-.62	.45	F = 2.32*
					R^2 = .22
		Constant	16.56		MS_e = 1.37
		Mingo			
ARM CIRCUMFERENCE	164	Head Start	-.29	.18	F = .87
					R^2 = .03
		Constant	-.60		MS_e = 1.15

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

Table 5-6
(continued)

Regression Analysis of the Anthropometric Evaluation Measures Cross-Sectional Sample, Controlling for Mother's Height

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] SE_b	Statistics[c]
		Greene & Humphreys			
ESTIMATED MUSCLE CIRCUMFERENCE	28	Head Start	.81*	.35	F = 2.52*
					R^2 = .36
		Constant	7.41		MS_e = .45
		St. Clair			
ESTIMATED MUSCLE CIRCUMFERENCE	147	Head Start			F = 1.52
					R^2 = .04
		Constant	-2.31		MS_e = 1.88
		Maricopa			
ESTIMATED MUSCLE CIRCUMFERENCE	37	Head Start	.36	.46	F = .98
					R^2 = .11
		Constant	5.07		MS_e = 1.35
		Mingo			
ESTIMATED MUSCLE CIRCUMFERENCE	164	Head Start	-.23	.14	F = 1.42
					R^2 = .03
		Constant	-.96		MS_e = .70

[a] Adjusted for child's age, race and gender.

[b] Centered without weights

[c] MS_e is residual mean square

CHAPTER SIX

APPENDIX TABLES

Table 6 -1

Total 24-Hour Nutrient Intake and Percent of Recommended Daily Intake Received for Pretested Head Start-Eligible Children (Samples A and D) within Site

	Pretested Head Start-Eligible Children (Samples A & D) in:	
	Greene and Humphreys Counties	
Nutrient	2-3 Years (n=67)	4-6 Years (n=8)
Calories (Kcal/day)		
Mean	1382	1636
Median (min,max)	1289 (555, 3023)	1223 (856, 2223)
Mean % Standard (min,max)	114 (46, 286)	104 (57, 193)
Mean Intake per kg Body Weight	94	85
Protein (gms/day)		
Mean	49	49
Median (min,max)	47 (8, 96)	46 (22, 74)
Mean % Standard (min,max)	223 (36, 537)	194 (82, 180)
Mean Intake per kg Body Weight	3.3	2.9
Calcium (mg/day)		
Mean	516	636
Median (min,max)	449 (94, 1608)	615 (127, 1210)
Mean % Standard	64	79
Median % Standard (min,max)	56 (12, 201)	77 (16, 151)
Iron (mg/day)		
Mean	11	8.4
Median (min,max)	10 (2.5, 49)	6.9 (3.7, 12.8)
Mean % Standard	76	84
Median % Standard (min,max)	67 (17, 326)	69 (37, 128)
Magnesium (mg/day)		
Mean	172	165
Median (min,max)	169 (46, 405)	173 (70, 217)
Mean % Standard (min,max)	115 (31, 270)	82 (35, 108)
Phosphorous (mg/day)		
Mean	743	819
Median (min,max)	688 (188, 1834)	793 (296, 1319)
Mean % Standard (min,max)	93 (23, 229)	102 (37, 165)
Vitamin A (IU/day)		
Mean	4253	4121
Median (min,max)	2508 (234, 16,304)	1748 (587, 12,835)
Mean % Standard	213	165
Median % Standard (min,max)	125 (12, 815)	70 (23, 513)
Thiamine (mg/day)		
Mean	1.23	1.35
Median (min,max)	1.15 (.29, 4.35)	1.21 (.32, 2.26)
Mean % Standard (min,max)	234 (90, 659)	230 (94, 290)
Riboflavin (mg/day)		
Mean	1.43	1.42
Median (min,max)	1.24 (.18, 6.1)	1.49 (.37, 2.08)
Mean % Standard	195	183
Median % Standard (min,max)	160 (59, 624)	161 (80, 332)
Niacin (mg/day)		
Mean	14.88	11.87
Median (min,max)	13.04 (3.19, 53.95)	11.74 (5.42, 18.16)
Mean % Standard	168	124
Median % Standard (min,max)	142 (48, 508)	121 (96, 145)
Vitamin B6 (mg/day)		
Mean	1.36	0.97
Median (min,max)	1.11 (.17, 5.19)	0.94 (.39, 1.51)
Mean % Standard	151	75
Median % Standard (min,max)	123 (19, 577)	72 (30, 116)
Vitamin B12 (mg/day)		
Mean	3.06	2.38
Median (min,max)	2.21 (.15, 17.92)	2.24 (.78, 5.09)
Mean % Standard	153	95
Median % Standard (min,max)	111 (7, 896)	90 (31, 206)
Vitamin C (mg/day)		
Mean	103	103
Median (min,max)	85 (1, 310)	68 (5, 300)
Mean % Standard	230	230
Median % Standard (min,max)	188 (2, 689)	150 (11, 667)

Table 6 -1 (continued)

Total 24-hour Nutrient Intake and Percent of Recommended Daily Intake Received for Pretested Head Start-Eligible Children (Samples A and D) within Site

Nutrient	Pretested Head Start-Eligible Children (Samples A & D) in: St. Clair County	
	2-3 Years (n=67)	4-5 Years (n=8)
Calories (Kcal/day)		
Mean	1685	1782
Median (min,max)	1580 (469,3826)	1779 (558, 3922)
Mean % Standard (min,max)	142 (36, 343)	127 (33, 270)
Mean Intake per kg Body Weight	117	104
Protein (gms/day)		
Mean	60	69
Median (min,max)	56 (15, 150)	71 (26, 144)
Mean % Standard (min,max)	277 (65, 709)	265 (101, 536)
Mean Intake per kg Body Weight	4.2	4.0
Calcium (mg/day)		
Mean	668	733
Median (min,max)	564 (64, 2473)	580 (153, 2585)
Mean % Standard	84	92
Median % Standard (min,max)	71 (8, 309)	72 (19, 323)
Iron (mg/day)		
Mean	11.9	12.5
Median (min,max)	10 (4, 74)	11.8 (3.6, 35.5)
Mean % Standard	79	125
Median % Standard (min,max)	68 (27, 494)	118 (36, 355)
Magnesium (mg/day)		
Mean	196	212
Median (min,max)	179 (57, 503)	176 (84, 899)
Mean % Standard (min,max)	131 (38, 336)	106 (42, 450)
Phosphorous (mg/day)		
Mean	937	1061
Median (min,max)	816 (207, 2663)	1003 (374, 2636)
Mean % Standard	117	133
Median % Standard (min,max)	102 (26, 333)	125 (67, 329)
Vitamin A (IU/day)		
Mean	4046	4620
Median (min,max)	2385 (597, 22674)	3350 (420, 20298)
Mean % Standard	202	185
Median % Standard (min,max)	119 (30, 1134)	136 (17, 812)
Thiamine (mg/day)		
Mean	1.29	1.51
Median (min,max)	1.20 (0.38, 2.52)	1.17 (0.34, 4.43)
Mean % Standard (min,max)	197 (101, 347)	210 (94, 440)
Riboflavin (mg/day)		
Mean	1.44	1.77
Median (min,max)	1.46 (0.44, 4.56)	1.52 (0.50, 6.13)
Mean % Standard (min,max)	161 (68, 379)	182 (91, 437)
Niacin (mg/day)		
Mean	13.99	16.81
Median (min,max)	12.17 (4.53, 42.86)	15.96 (4.69, 36.82)
Mean % Standard	128	145
Median % Standard (min,max)	122 (62, 240)	136 (76, 280)
Vitamin B6 (mg/day)		
Mean	1.16	1.28
Median (min,max)	1.09 (0.18, 3.19)	1.19 (0.28, 3.88)
Mean % Standard (min,max)	129 (21, 355)	98 (21, 298)
Vitamin B12 (mg/day)		
Mean	3.14	4.23
Median (min,max)	2.65 (0.71, 13.40)	3.09 (0.84, 16.67)
Mean % Standard	157	169
Median % Standard (min,max)	132 (36, 670)	123 (33, 667)
Vitamin C (mg/day)		
Mean	108	130
Median (min,max)	78 (5, 438)	97 (4, 483)
Mean % Standard	241	289
Median % Standard (min,max)	174 (12, 974)	215 (8, 1073)

Table 6 -1 (continued)

Total 24-Hour Nutrient Intake and Percent of Recommended Daily Intake Received for Pretested Head Start-Eligible Children (Samples A and D) within Site

Nutrient	Pretested Head Start-Eligible Children (Samples A & D) in:	
	Maricopa County	
	2-3 Years (n=67)	4-6 Years (n=8)
Calories (Kcal/day)		
Mean	1269	1398
Median (min,max)	1198 (398, 2037)	1322 (563, 3278)
Mean % Standard (min,max)	96 (27, 170)	102 (40, 209)
Mean Intake per kg Body Weight	79	83
Protein (gms/day)		
Mean	49	50
Median (min,max)	45 (13, 81)	46 (16, 129)
Mean % Standard (min,max)	204 (53, 397)	201 (56, 416)
Mean Intake per kg Body Weight	3.05	3.0
Calcium (mg/day)		
Mean	760	681
Median (min,max)	790 (73, 1969)	600 (145, 2249)
Mean % Standard (min,max)	95 (9, 246)	85 (18, 281)
Iron (mg/day)		
Mean	8.1	9.0
Median (min,mau)	7.1 (3.2, 16.2)	7.6 (2.4, 2.8)
Mean % Standard	54	90
Median % Standard (min,max)	67 (21, 108)	76 (24, 282)
Magnesium (mg/day)		
Mean	162	161
Median (min,max)	164 (46, 248)	143 (48, 523)
Mean % Standard (min,max)	108 (31, 165)	80 (24, 261)
Phosphorous (mg/day)		
Mean	916	885
Median (min,max)	900 (203, 2009)	817 (250, 2506)
Mean % Standard (min,max)	114 (25, 251)	111 (31, 313)
Vitamin A (IU/day)		
Mean	3257	3689
Median (min,max)	2450 (457,10922)	2361 (355, 41299)
Mean % Standard	163	140
Median % Standard (min,max)	122 (23, 546)	96 (14, 1652)
Thiamine (mg/day)		
Mean	0.88	0.94
Median (min,max)	0.83 (0.13, 1.60)	0.77 (0.25, 2.58)
Mean % Standard (min,max)	172 (78, 312)	169 (48, 316)
Riboflavin (mg/day)		
Mean	1.45	1.60
Median (min,max)	1.47 (.20, 2.86))	1.20 (0.50, 4.38)
Mean % Standard (min,max)	205 (69, 308)	185 (85, 640)
Niacin (mg/day)		
Mean	9.66	9.83
Median (min,max)	8.65 (1.62, 26.15)	8.88 (1.78, 25.30)
Mean % Standard (min,max)	115 (34, 220)	109 (42, 242)
Vitamin B6 (mg/day)		
Mean	0.97	0.92
Median (min,max)	0.82 (0.16, 2.69)	0.80 (0.24, 2.96)
Mean % Standard	108	71
Median % Standard (min,max)	91 (18, 299)	62 (19, 227)
Vitamin B12 (mg/day)		
Mean	2.99	4.07
Median (min,max)	3.03 (0.38, 7.48)	2.68 (0.43, 57.02)
Mean % Standard (min,max)	150 (19, 374)	163 (17, 2281)
Vitamin C (mg/day)		
Mean	88	76
Median (min,max)	64 (6, 348)	61 (0, 324)
Mean % Standard	196	168
Median % Standard (min,rax)	142 (13, 773)	137 (0, 719)

Table 6 -1 (continued)

Total 24-Hour Nutrient Intake and Percent of Recommended Daily Intake Received for Pretested Head Start-Eligible Children (Samples A and D) within Site

Nutrient	Pretested Head Start-Eligible Children (Samples A & D) in:	
	Greene and Humphreys Counties	
	2-3 Years (n=67)	4-5 Years (n=8)
Calories (Kcal/day)		
Mean	1765	2028
Median (min,max)	1618 (468, 3779)	1802 (877, 3655)
Mean % Standard (min,max)	144 (37, 290)	137 (86, 245)
Mean Intake per kg Body Weight	118	113
Protein (gms/day)		
Mean	64	59
Median (min,max)	57 (19, 115)	56 (34, 100)
Mean % Standard (min,max)	284 (81, 549)	220 (127, 376)
Mean Intake per kg Body Weight	4.3	3.3
Calcium (mg/day)		
Mean	907	974
Median (min,max)	805 (115, 2679)	907 (420, 1737)
Mean % Standard (min,max)	113 (14, 335)	122 (53, 217)
Iron (mg/day)		
Mean	11.9	12.3
Median (min,max)	10.4 (3.2, 32.5)	9.6 (6.2, 23.5)
Mean % Standard	80	123
Median % Standard (min,max)	69 (21, 217)	96 (62, 255)
Magnesium (mg/day)		
Mean	216	232
Median (min,max)	190 (57, 498)	197 (91, 473)
Mean % Standard (min,max)	164 (38, 332)	116 (45, 239)
Phosphorous (mg/day)		
Mean	1191	1208
Median (min,max)	1078 (365, 2724)	1106 (486, 1910)
Mean % Standard (min,max)	150 (46, 341)	151 (61, 239)
Vitamin A (IU/day)		
Mean	4359	3096
Median (min,max)	3201 (208, 35316)	2204 (1317, 6234)
Mean % Standard	218	124
Median % Standard (min,max)	160 (10, 1766)	88 (53, 250)
Thiamine (mg/day)		
Mean	1.40	1.36
Median (min,max)	1.35 (0.31, 3.24)	1.09 (0.67, 2.55)
Mean % Standard	206	173
Median % Standard (min,max)	183 (118, 552)	156 (112, 319)
Riboflavin (mg/day)		
Mean	1.94	1.90
Median (min,max)	1.65 (0.58, 4.44)	1.79 (0.86, 2.70)
Mean % Standard (min,max)	210 (78, 573)	180 (120, 277)
Niacin (mg/day)		
Mean	14.15	13.0
Median (min,max)	11.76 (2.18, 33.69)	10.88 (6.39, 24.40)
Mean % Standard	125	101
Median % Standard (min,max)	113 (32, 348)	76 (58, 209)
Vitamin B6 (mg/day)		
Mean	1.39	1.22
Median (min,max)	1.22 (0.31, 4.47)	0.91 (0.41, 2.83)
Mean % Standard	154	94
Median % Standard (min,max)	135 (34, 497)	70 (32, 217)
Vitamin B12 (mg/day)		
Mean	4.61	4.04
Median (min,max)	3.49 (0.96, 43.11)	3.53 (1.60, 7.36))
Mean % Standard	231	162
Median % Standard (min,max)	175 (48, 2155)	141 (64, 294)
Vitamin C (mg/day)		
Mean	95	84
Median (min,max)	86 (0, 376)	33 (7, 281)
Mean % Standard	211	187
Median % Standard (min,max)	191 (0, 836)	74 (17, 625)

Table 6 -2

Mean 24-Hour Nutrient Intake Percent of Recommended
Daily Intake Received:[a] USDA Household Food Consumption Survey (HFCS),[b]
First National Health and Nutrition Examination Survey (NHANES-I),[c]
and Ten-State Nutrition Survey (TSNS)[d]

	HFCS	NHANES-1	TSNS
	3 to 5 years (n=51)	2 to 6 years (n=627)	2 to 3 years (n=278)
KILOCALORIES			
Intake	1642	1586	1264
Percent Standard[e]	92	119	112
PROTEIN (gm)			
Intake	58	57	53
Percent Standard[e]	207	228	231
CALCIUM (mg)			
Intake	752	838	701
Percent Standard[f]	94	104	87
IRON (mg)			
Intake	10.3	8.3	6.6
Percent Stardard	86	70	43
MAGNESIUM (mg)			
Intake	170	not	not
Percent Standard	93	available	available
PHOSPHORUS (mg)			
Intake	952	not	not
Percent Standard	119	available	available
VITAMIN A (IU)			
Intake	3593	3718	3309
Percent Standard[f]	134	166	167
THIAMIN (mg)			
Intake	1.29	1.11	0.76
Percent Standard[e]	161	173	169
RIBOFLAVIN (mg)			
Intake	1.76	1.72	1.53
Percent Standard[e]	196	198	252
NIACIN (mg)			
Intake	14.8	10.53	8.07
Percent Standard[e]	148	100	98
VITAMIN B_6 (mg)			
Intake	1.13	not	not
Percent Standard	96	available	available
VITAMIN B_{12} (mcg)			
Intake	3.42	not	not
Percent Standard	149	available	available
VITAMIN C (mg)			
Intake	71	70	43
Percent Standard[f]	137	175	95

[a] Comparable data from the Head Start Health Evaluation is shown in Appendix Tables 6-12 through 6-23.

[b] Conducted 1977-1978. Figures presented here include only those children with family incomes below $6000/year.

[c] Conducted 1971-1974. Figures presented here include only children of low-income families. Figures represent weighted averages of values for 2 to 3 year old children and 4 to 6 year old children.

[d] Conducted 1968-1970. Figures presented here include only children from low-income ratio.

[e] USDA-HFCS Standards based on average RDA values1--not adjusted for body weight (calories and protein) or total caloric intake (thiamin, riboflavin, niacin). In general, use of these RDA values results in larger numbers of children not achieving the standard and/or a lower mean percent of standard.

[f] NANES and TSNS standards were different (lower) than those used in this evaluation. Mean percent of standard figures presented here are based on the standard used in this evaluation, so do not match exactly the figures reported in the literature. (Mean intakes are the same.)

Table 6 -3

Nutrient Density for Pretested Head Start-Eligible Children (Samples A & D) within Site

	Pretested Head Start-Eligible Children (Samples A & D) in:			
	Greene and Humphreys Counties		St. Clair County	
	2-3 years (n=67)	4-6 years (n=8)	2-3 years (n=59)	4-6 years (n=35)
Calories	1382	1436	1685	1782
Protein (gm)[a]	36±9	34±6	36±8	39±8
Calcium (mg)	377±148	461±307	397±192	413±182
Iron (mg)	8.6±5.2	5.7±1.1	6.9±2.7	6.9±2.2
Magnesium (mg)	126±42	118±41	119±42	117±48
Phosphorus (mg)	550±134	570±156	557±149	590±117
Vitamin A (IU)[b]	3098±2865	2886±2827	2462±2703	2984±3375
Thiamin (mg)	0.93±0.47	0.92±0.25	0.79±0.25	0.84±0.31
Riboflavin (mg)	1.07±0.58	1.01±0.43	0.88±0.31	1.0±0.4
Niacin (mg)[c]	11.12±5.83	8.18±1.15	8.45±2.61	9.6±2.9
Vitamin B_6 (mg)	1.04±0.66	0.68±0.25	0.72±0.33	0.74±0.32
Vitamin B_{12} (mcg)	2.28±1.99	1.66±0.73	1.89±0.90	2.30±1.56
Vitamin C (mg)	77±65	76±91	66±58	75±58

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[a] All values expressed represent units of nutrient per 1000 calories.

[b] Total vitamin A value.

[c] Milligrams preformed niacin

Table 6 -3 (continued)

Nutrient Density for Pretested Head Start-Eligible Children (Samples A & D) within Site

Pretested Head Start-Eligible Children (Samples A & D) in:	Maricopa County		Mingo County	
	2-3 years (n=59)	4-6 years (n=35)	2-3 years (n=53)	4-6 years (n=10)
Calories	1269	1398	1765	2028
Protein (gm)[a]	36±8	39±8	37±8	30±6
Calcium (mg)	397±192	413±182	512±227	517±199
Iron (mg)	6.9±2.7	6.9±2.2	7.0±0.4	6.1±2.8
Magnesium (mg)	119±42	117±48	125±29	113±16
Phosphorus (mg)	557±149	590±117	686±170	619±149
Vitamin A (IU)[b]	2462±2703	2984±3375	2823±5339	1610±860
Thiamin (mg)	0.79±0.25	0.84±0.31	0.82±0.34	0.69±0.23
Riboflavin (mg)	0.88±0.31	1.0±0.4	1.15±0.52	0.99±0.27
Niacin (mg)[c]	8.45±2.61	9.6±2.9	8.24±3.62	6.66±3.03
Vitamin B_6 (mg)	0.72±0.33	0.74±0.32	0.79±0.44	0.59±0.30
Vitamin B_{12} (mcg)	1.89±0.90	2.30±1.56	3.12±6.38	2.14±0.95
Vitamin C (mg)	66±53	75±58	56±50	44±49

[a] All values expressed represent units of nutrient per 1000 calories.

[b] Total vitamin A value.

[c] Milligrams preformed niacin

Table 6 -4

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
KILOCALORIES						
Greene/Humphreys						
Intake from H.S. Meals	109	613.18	721.00	821.87	729.36	172.00
Pct of Dietary Standard	110	44.35	54.90	61.64	54.23	14.30
St.Clair						
Intake from H.S. Meals	71	607.14	767.49	894.73	777.30	231.00
Pct of Dietary Standard	72	41.67	54.69	67.05	56.42	17.50
Maricopa						
Intake from H.S. Meals	58	437.29	518.94	741.02	600.44	258.00
Pct of Dietary Standard	58	29.60	37.07	51.44	41.02	15.40
Mingo						
Intake from H.S. Meals	67	658.41	847.50	1040.87	842.52	268.00
Pct of Dietary Standard	70	46.22	61.38	72.92	60.66	19.90
PROTEIN (GM)						
Greene/Humphreys						
Intake from H.S. Meals	108	24.20	30.06	37.62	31.34	9.88
Pct of Dietary Standard	109	81.93	100.75	126.29	103.00	32.20
St.Clair						
Intake from H.S. Meals	72	21.77	28.10	35.07	28.98	9.21
Pct of Dietary Standard	70	69.97	92.43	116.05	94.01	31.60
Maricopa						
Intake from H.S. Meals	56	16.16	20.94	32.63	24.06	10.60
Pct of Dietary Standard	57	51.89	66.14	102.43	76.78	37.90
Mingo						
Intake from H.S. Meals	71	25.38	32.75	38.26	32.44	11.00
Pct of Dietary Standard	71	74.95	100.66	123.61	101.21	32.70

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
CALCIUM (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	505.34	686.96	729.38	618.32	172.00
Pct of Dietary Standard	110	63.17	85.87	91.17	77.29	21.40
St.Clair						
Intake from H.S. Meals	71	346.61	504.03	652.20	493.27	205.00
Pct of Dietary Standard	69	42.84	62.86	78.43	60.95	25.70
Maricopa						
Intake from H.S. Meals	56	328.39	388.06	515.48	399.28	148.00
Pct of Dietary Standard	56	41.05	48.51	64.43	49.91	18.60
Mingo						
Intake from H.S. Meals	70	514.04	667.05	779.31	643.07	237.00
Pct of Dietary Standard	71	64.28	83.79	97.41	80.48	29.40
IRON (MG)						
Greene/Humphreys						
Intake from H.S. Meals	108	3.31	4.25	5.97	4.94	2.34
Pct of Dietary Standard	109	28.21	37.99	54.12	43.20	22.80
St.Clair						
Intake from H.S. Meals	70	3.91	4.78	5.90	4.76	1.31
Pct of Dietary Standard	70	32.23	40.69	53.76	42.38	14.60
Maricopa						
Intake from H.S. Meals	55	2.41	2.88	4.19	3.44	1.76
Pct of Dietary Standard	55	24.07	28.81	41.86	34.37	17.60
Mingo						
Intake from H.S. Meals	71	3.48	4.62	5.81	4.83	2.01
Pct of Dietary Standard	71	28.85	42.32	57.15	44.54	21.50

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
MAGNESIUM (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	95.58	115.27	137.95	119.07	32.90
Pct of Dietary Standard	110	51.14	65.38	79.91	66.33	19.80
St.Clair						
Intake from H.S. Meals	71	91.02	125.20	153.64	127.00	47.20
Pct of Dietary Standard	72	53.95	68.27	83.58	70.39	26.00
Maricopa						
Intake from H.S. Meals	58	57.18	73.63	98.94	77.56	31.00
Pct of Dietary Standard	58	28.59	36.81	49.47	38.78	15.50
Mingo						
Intake from H.S. Meals	68	104.33	121.38	145.88	123.26	45.90
Pct of Dietary Standard	70	53.27	65.92	78.47	66.83	24.90
PHOSPHORUS (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	529.41	660.78	776.48	661.42	188.00
Pct of Dietary Standard	109	66.18	82.56	96.55	82.25	23.10
St.Clair						
Intake from H.S. Meals	71	427.72	556.65	686.65	553.50	194.00
Pct of Dietary Standard	71	53.46	69.58	85.56	68.68	23.80
Maricopa						
Intake from H.S. Meals	57	333.33	403.19	544.63	438.68	189.00
Pct of Dietary Standard	57	41.67	50.40	63.08	54.83	23.70
Mingo						
Intake from H.S. Meals	71	551.54	643.88	782.26	641.82	220.00
Pct of Dietary Standard	72	68.94	80.59	97.78	80.29	27.30

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN A (IU)						
Greene/Humphreys						
Intake from H.S. Meals	108	1561.	2332.	5448.	6839.	10243.
Pct of Dietary Standard	107	67.	110.	259.	308.	488.
St.Clair						
Intake from H.S. Meals	72	1342.	2671.	4179.	4271.	5807.
Pct of Dietary Standard	72	61.	114.	177.	187.	263.
Maricopa						
Intake from H.S. Meals	57	787.	1059.	1466.	1349.	1251.
Pct of Dietary Standard	58	31.	42.	61.	54.	50.
Mingo						
Intake from H.S. Meals	72	1282.	1623.	2337.	2017.	1141.
Pct of Dietary Standard	72	57.	70.	116.	85.	46.
THIAMIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	109	0.43	0.51	0.62	0.54	0.16
Pct of Dietary Standard	110	50.71	63.17	87.56	68.46	22.00
St.Clair						
Intake from H.S. Meals	71	0.42	0.54	0.62	0.52	0.15
Pct of Dietary Standard	70	42.43	50.42	64.03	51.58	16.40
Maricopa						
Intake from H.S. Meals	57	0.31	0.39	0.46	0.40	0.14
Pct of Dietary Standard	54	40.93	52.68	64.32	54.85	20.20
Mingo						
Intake from H.S. Meals	69	0.53	0.61	0.81	0.65	0.25
Pct of Dietary Standard	72	51.30	62.34	79.89	65.82	23.30

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
RIBOFLAVIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	103	0.88	1.11	1.31	1.22	0.55
Pct of Dietary Standard	101	88.01	126.36	163.31	136.20	57.00
St.Clair						
Intake from H.S. Meals	72	0.76	0.97	1.19	1.01	0.49
Pct of Dietary Standard	71	61.08	87.05	110.51	89.82	45.50
Maricopa						
Intake from H.S. Meals	55	0.55	0.67	0.80	0.69	0.29
Pct of Dietary Standard	57	80.26	81.69	105.42	84.35	31.10
Mingo						
Intake from H.S. Meals	71	0.90	1.12	1.30	1.06	0.35
Pct of Dietary Standard	72	75.67	98.54	120.97	98.28	32.60
NIACIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	106	3.38	4.64	7.63	5.97	3.50
Pct of Dietary Standard	109	32.24	45.99	71.68	58.93	39.70
St.Clair						
Intake from H.S. Meals	72	4.50	5.46	6.30	5.52	1.92
Pct of Dietary Standard	71	30.85	39.88	50.99	42.26	18.00
Maricopa						
Intake from H.S. Meals	57	2.28	3.15	4.58	3.79	2.93
Pct of Dietary Standard	56	24.85	32.12	45.85	38.34	22.40
Mingo						
Intake from H.S. Meals	70	3.55	4.81	6.15	5.17	2.37
Pct of Dietary Standard	71	25.88	35.12	49.07	41.01	19.60

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN B6 (MG)						
Greene/Humphreys						
Intake from H.S. Meals	106	0.38	0.52	0.70	0.58	0.25
Pct of Dietary Standard	108	31.23	46.22	73.23	52.10	25.60
St.Clair						
Intake from H.S. Meals	69	0.42	0.50	0.68	0.55	0.21
Pct of Dietary Standard	71	35.11	44.23	57.77	49.05	19.50
Maricopa						
Intake from H.S. Meals	57	0.29	0.37	0.45	0.38	0.20
Pct of Dietary Standard	55	21.81	27.69	34.19	28.99	15.70
Mingo						
Intake from H.S. Meals	70	0.41	0.54	0.74	0.57	0.25
Pct of Dietary Standard	71	34.81	46.44	58.15	49.16	22.90
VITAMIN B12 (MCG)						
Greene/Humphreys						
Intake from H.S. Meals	94	1.63	2.08	2.92	2.87	2.96
Pct of Dietary Standard	102	73.60	98.13	142.75	275.46	670.00
St.Clair						
Intake from H.S. Meals	67	1.31	1.89	2.23	1.82	0.79
Pct of Dietary Standard	68	59.43	80.02	101.63	86.95	75.80
Maricopa						
Intake from H.S. Meals	56	1.04	1.51	1.96	1.65	1.07
Pct of Dietary Standard	58	41.96	61.72	81.08	67.09	42.80
Mingo						
Intake from H.S. Meals	71	1.55	2.14	2.67	2.11	0.88
Pct of Dietary Standard	72	62.98	90.52	109.42	89.70	37.00

Table 6 -4 (continued)

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN C (MG)						
Greene/Humphreys						
Intake from H.S. Meals	108	27.84	36.71	46.21	38.71	19.30
Pct of Dietary Standard	110	62.07	82.52	103.22	86.96	43.60
St.Clair						
Intake from H.S. Meals	71	60.40	68.70	79.41	71.03	16.50
Pct of Dietary Standard	71	134.22	152.67	176.46	157.83	36.70
Maricopa						
Intake from H.S. Meals	58	10.95	24.16	41.58	30.70	29.90
Pct of Dietary Standard	57	25.16	54.58	92.40	70.57	64.60
Mingo						
Intake from H.S. Meals	66	25.92	45.19	61.41	47.04	30.60
Pct of Dietary Standard	66	57.60	102.55	136.48	104.54	67.90

Table 6 -5

Nutrient Intake from Head Start Meals and Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall across Sites

	N	Q1	MED	Q3	MEAN	SD
KILOCALORIES						
Intake from H.S. Meals	305	572.41	734.52	869.43	740.86	239.00
Pct of Dietary Standard	310	40.89	53.10	64.73	53.72	17.80
PROTEIN (GM)						
Intake from H.S. Meals	307	21.96	29.63	35.92	29.71	10.50
Pct of Dietary Standard	307	70.14	95.71	117.90	95.67	34.50
CALCIUM (MG)						
Intake from H.S. Meals	307	393.54	580.40	710.32	555.08	213.00
Pct of Dietary Standard	306	48.94	72.55	88.86	69.34	26.60
IRON (MG)						
Intake from H.S. Meals	304	3.10	4.30	5.73	4.60	2.03
Pct of Dietary Standard	306	27.17	38.50	52.90	41.73	20.20
MAGNESIUM (MG)						
Intake from H.S. Meals	307	86.25	113.26	137.69	113.99	43.10
Pct of Dietary Standard	310	43.95	61.19	76.74	62.23	24.60
PHOSPHORUS (MG)						
Intake from H.S. Meals	309	429.00	616.79	721.62	591.03	213.00
Pct of Dietary Standard	309	53.63	77.01	89.97	73.62	26.40
VITAMIN A (IU)						
Intake from H.S. Meals	309	1187.	1869.	3641.	4104.	7061.
Pct of Dietary Standard	309	51.	78.	150.	181.	331.
THIAMIN (MG)						
Intake from H.S. Meals	306	0.39	0.52	0.62	0.53	0.19
Pct of Dietary Standard	306	47.15	58.94	75.77	61.58	22.00
RIBOFLAVIN (MG)						
Intake from H.S. Meals	301	0.70	1.04	1.21	1.04	0.48
Pct of Dietary Standard	301	74.43	101.03	130.33	106.39	49.70
NIACIN (MG)						
Intake from H.S. Meals	305	3.29	4.62	6.25	5.27	2.92
Pct of Dietary Standard	307	28.47	39.14	56.24	47.18	29.80
VITAMIN B6 (MG)						
Intake from H.S. Meals	302	0.37	0.47	0.68	0.53	0.24
Pct of Dietary Standard	305	29.00	42.15	57.44	46.54	23.50
VITAMIN B12 (MCG)						
Intake from H.S. Meals	288	1.38	1.97	2.57	2.20	1.91
Pct of Dietary Standard	300	59.48	83.52	110.98	147.87	402.00
VITAMIN C (MG)						
Intake from H.S. Meals	302	26.06	41.82	64.22	46.82	27.60
Pct of Dietary Standard	304	58.17	92.93	142.80	104.26	61.30

Table 6 -6

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
KILOCALORIES						
Greene/Humphreys						
Intake from H.S. Meals	109	613.16	721.00	821.87	729.36	172.00
Pct of Total Daily Intake	109	37.37	46.08	55.87	47.07	13.20
St.Clair						
Intake from H.S. Meals	71	607.14	767.49	894.73	777.30	231.00
Pct of Total Daily Intake	71	30.27	37.93	47.95	38.81	11.30
Maricopa						
Intake from H.S. Meals	58	437.29	518.94	741.02	600.44	258.00
Pct of Total Daily Intake	58	31.60	35.62	46.68	39.57	14.00
Mingo						
Intake from H.S. Meals	67	658.41	847.90	1040.87	842.52	268.00
Pct of Total Daily Intake	67	35.33	45.70	51.08	44.60	12.30
PROTEIN (GM)						
Greene/Humphreys						
Intake from H.S. Meals	108	24.20	30.06	37.62	31.34	9.88
Pct of Total Daily Intake	108	39.68	49.25	62.77	51.80	17.30
St.Clair						
Intake from H.S. Meals	72	21.77	28.10	35.07	28.98	9.21
Pct of Total Daily Intake	72	30.70	40.40	48.19	40.16	13.20
Maricopa						
Intake from H.S. Meals	56	16.16	20.94	32.63	24.06	10.60
Pct of Total Daily Intake	56	30.64	38.55	53.38	42.65	15.80
Mingo						
Intake from H.S. Meals	71	25.38	32.75	38.26	32.44	11.00
Pct of Total Daily Intake	71	36.37	44.33	52.32	45.40	13.30

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
FAT (GM)						
Greene/Humphreys						
Intake from H.S. Meals	107	23.68	29.28	34.97	29.63	8.46
Pct of Total Daily Intake	107	36.63	49.04	60.19	50.09	16.50
St.Clair						
Intake from H.S. Meals	71	20.94	28.69	37.79	29.34	11.70
Pct of Total Daily Intake	71	27.25	39.23	45.70	37.35	13.50
Maricopa						
Intake from H.S. Meals	58	19.47	25.37	38.33	29.02	13.30
Pct of Total Daily Intake	58	35.84	43.73	57.47	45.60	17.00
Mingo						
Intake from H.S. Meals	66	24.38	33.46	37.54	31.58	9.88
Pct of Total Daily Intake	64	34.85	43.35	52.38	44.45	13.60
CARBOHYDRATE (GM)						
Greene/Humphreys						
Intake from H.S. Meals	110	70.37	84.98	98.32	86.81	23.50
Pct of Total Daily Intake	110	35.16	43.48	52.18	44.56	12.80
St.Clair						
Intake from H.S. Meals	71	73.86	97.40	113.09	102.10	39.30
Pct of Total Daily Intake	71	30.90	35.71	46.76	39.60	12.70
Maricopa						
Intake from H.S. Meals	58	44.80	56.83	67.88	59.16	23.90
Pct of Total Daily Intake	58	25.76	29.62	40.14	34.15	14.90
Mingo						
Intake from H.S. Meals	70	85.94	105.67	137.72	110.27	43.10
Pct of Total Daily Intake	70	34.16	46.80	55.05	44.65	14.30

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
CALCIUM (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	505.34	686.96	729.38	618.32	172.00
Pct of Total Daily Intake	110	53.43	67.96	81.84	66.73	18.10
St.Clair						
Intake from H.S. Meals	71	346.61	504.03	652.20	493.27	205.00
Pct of Total Daily Intake	71	33.22	48.19	57.82	46.67	17.30
Maricopa						
Intake from H.S. Meals	56	328.39	388.06	515.48	399.28	148.00
Pct of Total Daily Intake	56	36.58	46.67	57.53	49.23	18.80
Mingo						
Intake from H.S. Meals	70	514.04	667.05	779.31	643.07	237.00
Pct of Total Daily Intake	70	47.18	54.58	67.14	56.74	15.80
IRON (MG)						
Greene/Humphreys						
Intake from H.S. Meals	108	3.31	4.25	5.97	4.94	2.34
Pct of Total Daily Intake	108	34.90	44.78	58.49	47.86	17.70
St.Clair						
Intake from H.S. Meals	70	3.91	4.78	5.90	4.76	1.31
Pct of Total Daily Intake	70	29.26	37.60	47.46	39.19	12.40
Maricopa						
Intake from H.S. Meals	55	2.41	2.88	4.19	3.44	1.76
Pct of Total Daily Intake	55	26.05	36.73	43.50	37.46	14.80
Mingo						
Intake from H.S. Meals	71	3.48	4.62	5.81	4.83	2.01
Pct of Total Daily Intake	71	30.67	40.01	49.53	41.93	15.00

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
MAGNESIUM (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	95.58	115.27	137.95	119.07	32.90
Pct of Total Daily Intake	110	42.29	50.84	65.89	54.35	15.60
St.Clair						
Intake from H.S. Meals	71	91.02	125.20	153.64	127.00	47.20
Pct of Total Daily Intake	71	33.16	43.16	57.64	45.38	15.50
Maricopa						
Intake from H.S. Meals	58	57.18	73.63	88.84	77.56	31.00
Pct of Total Daily Intake	58	30.76	38.67	54.71	42.31	16.40
Mingo						
Intake from H.S. Meals	68	104.33	121.38	145.89	123.26	45.90
Pct of Total Daily Intake	68	38.72	47.06	57.22	49.23	14.70
PHOSPHORUS (MG)						
Greene/Humphreys						
Intake from H.S. Meals	110	529.41	660.78	776.48	661.42	188.00
Pct of Total Daily Intake	110	45.50	58.42	71.12	58.44	16.70
St.Clair						
Intake from H.S. Meals	71	427.72	556.65	686.65	553.50	194.00
Pct of Total Daily Intake	71	32.08	42.76	52.18	43.07	14.30
Maricopa						
Intake from H.S. Meals	57	333.33	403.19	544.63	438.68	189.00
Pct of Total Daily Intake	57	32.41	40.67	54.21	43.54	15.10
Mingo						
Intake from H.S. Meals	71	551.54	643.88	782.26	641.82	220.00
Pct of Total Daily Intake	71	40.58	46.94	59.11	48.85	13.70

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN A (IU)						
Greene/Humphreys						
Intake from H.S. Meals	108	1561.	2332.	5448.	6838.	10243.
Pct of Total Daily Intake	108	46.	69.	86.	64.	27.
St.Clair						
Intake from H.S. Meals	72	1342.	2671.	4179.	4271.	5807.
Pct of Total Daily Intake	72	31.	51.	66.	50.	23.
Maricopa						
Intake from H.S. Meals	57	787.	1059.	1466.	1349.	1251.
Pct of Total Daily Intake	57	22.	37.	59.	42.	26.
Mingo						
Intake from H.S. Meals	72	1282.	1623.	2337.	2017.	1141.
Pct of Total Daily Intake	72	32.	51.	66.	48.	22.
THIAMIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	109	0.43	0.51	0.62	0.54	0.16
Pct of Total Daily Intake	109	35.36	44.14	61.68	47.48	17.60
St.Clair						
Intake from H.S. Meals	71	0.42	0.54	0.62	0.52	0.15
Pct of Total Daily Intake	71	27.84	34.80	45.61	36.22	12.10
Maricopa						
Intake from H.S. Meals	57	0.31	0.39	0.46	0.40	0.14
Pct of Total Daily Intake	57	27.42	37.90	46.40	40.14	16.50
Mingo						
Intake from H.S. Meals	69	0.53	0.61	0.81	0.65	0.25
Pct of Total Daily Intake	69	38.27	45.51	56.49	47.59	14.70

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
RIBOFLAVIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	103	0.98	1.11	1.31	1.22	0.55
Pct of Total Daily Intake	103	48.79	62.44	75.00	61.76	17.40
St.Clair						
Intake from H.S. Meals	72	0.76	0.97	1.19	1.01	0.49
Pct of Total Daily Intake	72	31.66	41.29	51.21	43.27	16.10
Maricopa						
Intake from H.S. Meals	55	0.55	0.67	0.80	0.69	0.29
Pct of Total Daily Intake	55	31.31	40.31	52.15	44.39	17.90
Mingo						
Intake from H.S. Meals	71	0.90	1.12	1.30	1.06	0.35
Pct of Total Daily Intake	71	42.49	51.46	60.76	51.14	14.60
NIACIN (MG)						
Greene/Humphreys						
Intake from H.S. Meals	106	3.38	4.64	7.63	5.97	3.50
Pct of Total Daily Intake	106	26.96	39.85	56.93	48.42	20.30
St.Clair						
Intake from H.S. Meals	72	4.50	5.46	6.30	5.52	1.92
Pct of Total Daily Intake	72	23.23	33.07	45.58	34.79	14.00
Maricopa						
Intake from H.S. Meals	57	2.28	3.15	4.58	3.79	2.93
Pct of Total Daily Intake	57	18.19	29.53	41.91	34.50	19.80
Mingo						
Intake from H.S. Meals	70	3.55	4.81	6.15	5.17	2.37
Pct of Total Daily Intake	70	26.41	33.68	45.85	37.35	15.70

Table 6-6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN B6 (MG)						
Greene/Humphreys						
Intake from H.S. Meals	106	0.38	0.52	0.70	0.58	0.25
Pct of Total Daily Intake	106	32.86	47.31	59.91	47.78	18.50
St.Clair						
Intake from H.S. Meals	69	0.42	0.50	0.68	0.55	0.21
Pct of Total Daily Intake	69	27.32	35.38	47.89	37.85	14.10
Maricopa						
Intake from H.S. Meals	57	0.29	0.37	0.45	0.38	0.20
Pct of Total Daily Intake	57	21.79	30.53	49.90	36.14	19.20
Mingo						
Intake from H.S. Meals	70	0.41	0.54	0.74	0.57	0.25
Pct of Total Daily Intake	70	30.88	41.57	56.78	43.49	16.50
VITAMIN B12 (MCG)						
Greene/Humphreys						
Intake from H.S. Meals	94	1.63	2.08	2.92	2.87	2.96
Pct of Total Daily Intake	94	46.89	62.74	83.35	63.99	22.20
St.Clair						
Intake from H.S. Meals	67	1.31	1.89	2.23	1.82	0.79
Pct of Total Daily Intake	67	28.75	44.87	56.59	43.32	20.10
Maricopa						
Intake from H.S. Meals	56	1.04	1.51	1.96	1.65	1.07
Pct of Total Daily Intake	56	30.84	41.41	64.37	45.33	23.30
Mingo						
Intake from H.S. Meals	71	1.55	2.14	2.67	2.11	0.88
Pct of Total Daily Intake	71	39.68	51.11	64.47	50.77	18.20

Table 6 -6 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall within Site

	N	Q1	MED	Q3	MEAN	SD
VITAMIN C (MG)						
Greene/Humphreys						
Intake from H.S. Meals	108	27.84	36.71	46.21	38.71	19.30
Pct of Total Daily Intake	108	20.58	39.80	66.25	45.25	27.90
St.Clair						
Intake from H.S. Meals	71	60.40	68.70	79.41	71.03	16.50
Pct of Total Daily Intake	71	27.06	39.69	60.22	44.89	20.70
Maricopa						
Intake from H.S. Meals	57	11.32	24.56	41.58	31.76	29.10
Pct of Total Daily Intake	57	21.04	34.74	59.82	39.18	26.40
Mingo						
Intake from H.S. Meals	66	25.82	46.19	61.41	47.04	30.60
Pct of Total Daily Intake	66	25.76	45.86	72.28	46.30	25.60
CHOLESTEROL (MG)						
Greene/Humphreys						
Intake from H.S. Meals	105	94.22	143.35	277.17	189.27	121.00
Pct of Total Daily Intake	105	46.11	57.16	74.11	58.25	21.70
St.Clair						
Intake from H.S. Meals	71	90.18	152.67	272.22	188.38	127.00
Pct of Total Daily Intake	71	28.88	41.16	63.73	45.18	21.50
Maricopa						
Intake from H.S. Meals	58	55.97	87.60	129.56	150.78	176.00
Pct of Total Daily Intake	58	27.08	40.71	63.76	46.00	25.30
Mingo						
Intake from H.S. Meals	72	74.41	105.54	138.35	130.41	85.70
Pct of Total Daily Intake	72	34.25	41.84	50.00	42.95	17.50

Table 6 -7

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall across Sites

	N	Q1	MED	Q3	MEAN	SD
KILOCALORIES						
Intake from H.S. Meals	305	572.41	734.52	869.43	740.86	239.00
Pct of Total Daily Intake	305	33.09	42.07	51.18	43.18	13.20
PROTEIN (GM)						
Intake from H.S. Meals	307	21.96	29.63	35.92	29.71	10.50
Pct of Total Daily Intake	307	33.84	43.98	55.00	45.92	15.90
FAT (GM)						
Intake from H.S. Meals	302	22.88	29.22	36.62	29.87	10.60
Pct of Total Daily Intake	302	34.15	44.18	54.39	45.00	16.00
CARBOHYDRATE (GM)						
Intake from H.S. Meals	309	66.01	86.49	107.09	90.45	37.10
Pct of Total Daily Intake	309	31.15	39.22	51.63	41.49	14.00
CALCIUM (MG)						
Intake from H.S. Meals	307	393.54	580.40	710.32	555.09	213.00
Pct of Total Daily Intake	307	43.65	54.80	70.28	56.62	19.40
IRON (MG)						
Intake from H.S. Meals	304	3.10	4.30	5.73	4.60	2.03
Pct of Total Daily Intake	304	31.78	40.15	52.07	42.60	15.90
MAGNESIUM (MG)						
Intake from H.S. Meals	307	86.25	113.36	137.68	113.99	43.10
Pct of Total Daily Intake	307	36.99	46.64	60.54	48.87	16.20
PHOSPHORUS (MG)						
Intake from H.S. Meals	309	429.00	616.79	721.62	591.03	213.00
Pct of Total Daily Intake	309	38.04	48.19	61.32	49.86	16.60

Table 6 -7 (continued)

Nutrient Intake from Head Start Meals and Percent of Total Daily Intake for Posttested Head Start Children (Samples A, B, C) Present on Day of Recall across Sites

	N	Q1	MED	Q3	MEAN	SD
VITAMIN A (IU)						
Intake from H.S. Meals	309	1187.	1869.	3641.	4104.	7061.
Pct of Total Daily Intake	309	31.	53.	75.	53.	26.
THIAMIN (MG)						
Intake from H.S. Meals	306	0.39	0.52	0.62	0.53	0.19
Pct of Total Daily Intake	306	32.50	41.59	53.83	43.52	16.30
RIBOFLAVIN (MG)						
Intake from H.S. Meals	301	0.70	1.04	1.21	1.04	0.48
Pct of Total Daily Intake	301	38.50	49.17	64.23	51.66	18.20
NIACIN (MG)						
Intake from H.S. Meals	305	3.29	4.62	6.25	5.27	2.92
Pct of Total Daily Intake	305	24.31	35.38	49.45	38.32	18.20
VITAMIN B6 (MG)						
Intake from H.S. Meals	302	0.37	0.47	0.68	0.53	0.24
Pct of Total Daily Intake	302	29.17	40.34	54.64	42.32	17.80
VITAMIN B12 (MCG)						
Intake from H.S. Meals	288	1.38	1.97	2.57	2.20	1.91
Pct of Total Daily Intake	288	35.23	52.35	68.34	52.29	22.60
VITAMIN C (MG)						
Intake from H.S. Meals	302	26.06	41.82	64.22	46.82	27.60
Pct of Total Daily Intake	302	24.03	39.77	62.15	44.25	25.60
CHOLESTEROL (MG)						
Intake from H.S. Meals	306	81.56	120.13	232.11	167.92	130.00
Pct of Total Daily Intake	306	32.71	47.76	67.33	49.64	22.50

Table 6 -8

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Calories	183	Greene & Humphreys	-117.75	69.93
		St. Clair	206.18	81.80
		Maricopa	-136.78	88.70
		Mingo	48.35	69.94
		Program		
		Head Start Present vs. Non-Head Start	78.16	89.85
		Head Start Present vs. Head Start Absent	161.26	110.25
		Head Start Absent vs. Non-Head Start	-84.24	117.02
		Pretest Intake	0.29***	0.06
		Constant	1012.91	
		Statistics F = 4.82 R^2 = 0.25 MS_e = 280358.06		
		Site		
Protein	183	Greene & Humphreys	-0.91	2.86
		St. Clair	4.82	3.36
		Maricopa	-7.44*	3.61
		Mingo	3.53	2.79
		Program		
		Head Start Present vs. Non-Head Start	6.02	3.68
		Head Start Present vs. Head Start Absent	8.66	4.70
		Head Start Absent vs. Non-Head Start	-2.64*	4.76
		Pretest Intake	0.31***	0.07
		Constant	34.06	
		Statistics F = 4.16 R^2 = 0.23 MS_e = 467.91		

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Fat	183	Greene & Humphreys	-7.94*	3.70
		St. Clair	5.10	4.36
		Maricopa	-1.18	4.73
		Mingo	3.13	6.07
		Program		
		Head Start Present vs. Non-Head Start	does not enter equation	
		Head Start Present vs. Head Start Absent	8.71	6.13
		Head Start Absent vs. Non-Head Start	-9.02	6.22
		Pretest Intake	0.26***	0.07
		Constant	49.25	
		Statistics F = 3.98 R^2 = 0.22 MS_e = 794.93		
		Site		
Carbohydrate	183	Greene & Humphreys	-10.30	9.29
		St. Clair	33.79**	10.84
		Maricopa	-26.32*	11.71
		Mingo	2.84	3.09
		Program		
		Head Start Present vs. Non-Head Start	17.37	11.96
		Head Start Present vs. Head Start Absent	17.78	15.31
		Head Start Absent vs. Non-Head Start	does not enter equation	
		Pretest Intake	0.25***	0.06
		Constant	115.29	
		Statistics F = 3.74 R^2 = 0.21 MS_e = 4962.44		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Calcium	183	Greene & Humphreys	-70.30	45.81
		St. Clair	-8.23	52.14
		Maricopa	-33.62	56.14
		Mingo	112.14*	29.09
		Program		
		Head Start Present vs. Non-Head Start	270.03***	58.18
		Head Start Present vs. Head Start Absent	420.94***	73.88
		Head Start Absent vs. Non-Head Start	150.91*	74.62
		Pretest Intake	0.24***	0.06
		Constant	339.04	
		Statistics F = 6.51 R^2 = 0.32 MS_e = 114765.03		
		Site		
Iron	183	Greene & Humphreys	0.11	0.62
		St. Clair	1.30	0.73
		Maricopa	-1.69*	0.79
		Mingo	-0.27	0.63
		Program		
		Head Start Present vs. Non-Head Start	0.62	0.80
		Head Start Present vs. Head Start Absent	-0.34	1.03
		Head Start Absent vs. Non-Head Start	does not enter equation	
		Pretest Intake	0.29***	0.06
		Constant	6.14	
		Statistics F = 3.74 R^2 = 0.21 MS_e = 83.88		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

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Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Magnesium	183	Greene & Humphreys	-12.32	8.65
		St. Clair	21.96*	10.15
		Maricopa	-29.14**	11.02
		Mingo	19.50	5.56
		Program		
		Head Start Present vs. Non-Head Start	40.27***	11.13
		Head Start Present vs. Head Start Absent	65.44***	14.20
		Head Start Absent vs. Non-Head Start	-25.17	14.65
		Pretest Intake	0.28***	0.05
		Constant	90.12	
		Statistics $F = 8.00$ $R^2 = 0.36$ $MS_e = 4296.96$		
		Site		
Phosphorus	183	Greene & Humphreys	5.79	49.12
		St. Clair	12.81	56.26
		Maricopa	-116.83	60.81
		Mingo	-98.23	24.56
		Program		
		Head Start Present vs. Non-Head Start	167.09**	62.34
		Head Start Present vs. Head Start Absent	311.54***	79.52
		Head Start Absent vs. Non-Head Start	-144.44	80.46
		Pretest Intake	0.36***	0.06
		Constant	492.98	
		Statistics $F = 6.50$ $R^2 = 0.31$ $MS_e = 133443.31$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Vitamin A (log)	183	Greene & Humphreys	0.13**	0.05
		St. Clair	0.86	0.06
		Maricopa	-0.15*	0.06
		Mingo	-0.83	0.06
		Program		
		Head Start Present vs. Non-Head Start	0.27***	0.07
		Head Start Present vs. Head Start Absent	0.29***	0.08
		Head Start Absent vs. Non-Head Start	-0.22	0.08
		Pretest Intake	0.14*	0.06
		Constant	3.66	
		Statistics $F = 3.82$ $R^2 = 0.22$ $MS_e = 0.14$		
		Site		
Thiamin	183	Greene & Humphreys	-0.11	0.07
		St. Clair	0.12	0.09
		Maricopa	-0.17	0.10
		Mingo	0.06	0.12
		Program		
		Head Start Present vs. Non-Head Start	does not enter equation	
		Head Start Present vs. Head Start Absent	1.20	0.12
		Head Start Absent vs. Non-Head Start	-1.25	0.13
		Pretest Intake	0.18**	0.07
		Constant	0.64	
		Statistics $F = 2.11$ $R^2 = 0.12$ $MS_e = 0.32$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Riboflavin	183	Greene & Humphreys	0.27*	0.14
		St. Clair	0.19	0.15
		Maricopa	-0.34*	0.17
		Mingo	-0.05	0.13
		Program		
		Head Start Present vs. Non-Head Start	0.52**	0.17
		Head Start Present vs. Head Start Absent	0.68**	0.22
		Head Start Absent vs. Non-Head Start	1.62	0.23
		Pretest Intake	0.35***	0.09
		Constant	0.52	
		Statistics F = 3.88 R^2 = 0.21 MS_e = 1.05		
		Site		
Niacin	183	Greene & Humphreys	0.90	0.96
		St. Clair	1.69	1.11
		Maricopa	-3.49**	1.22
		Mingo	0.90	0.48
		Program		
		Head Start Present vs. Non-Head Start	0.73	1.23
		Head Start Present vs. Head Start Absent	1.24	0.13
		Head Start Absent vs. Non-Head Start	-0.55	1.59
		Pretest Intake	0.32***	0.07
		Constant	4.94	
		Statistics F = 3.50 R^2 = 0.20 MS_e = 52.11		

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Vitamin B6	183	Greene & Humphreys	0.23	0.08
		St. Clair	0.50	0.09
		Maricopa	-0.16	0.10
		Mingo	-0.57	0.11
		Program		
		Head Start Present vs. Non-Head Start	0.43	0.10
		Head Start Present vs. Head Start Absent	1.24	0.13
		Head Start Absent vs. Non-Head Start	-0.80	0.14
		Pretest Intake	0.23***	0.06
		Constant	0.25	
		Statistics $F = 2.40$ $R^2 = 0.14$ $MS_e = 0.39$		
		Site		
Vitamin B12 (log)	183	Greene & Humphreys	0.10*	0.05
		St. Clair	-0.31	0.06
		Maricopa	-0.78	0.06
		Mingo	1.19	0.07
		Program		
		Head Start Present vs. Non-Head Start	0.22***	0.06
		Head Start Present vs. Head Start Absent	1.82*	0.08
		Head Start Absent vs. Non-Head Start	0.34	0.08
		Pretest Intake	0.21**	0.08
		Constant	0.37	
		Statistics $F = 2.90$ $R^2 = $ C.18 $MS_e = 0.12$		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -8 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Vitamin C	183	Greene & Humphreys	3.13	11.74
		St. Clair	39.96***	13.77
		Maricopa	-32.42*	14.77
		Mingo	-30.67	19.19
		Program		
		Head Start Present vs. Non-Head Start	1.85	15.12
		Head Start Present vs. Head Start Absent	4.33	18.55
		Head Start Absent vs. Non-Head Start	does not enter equation	
		Pretest Intake	0.27***	0.08
		Constant	54.75	
		Statistics F = 3.48 R^2 = 0.20 MS_e = 7942.39		
		Site		
Cholesterol	183	Greene & Humphreys	33.89	28.04
		St. Clair	-6.35	32.19
		Maricopa	21.46	34.70
		Mingo	-48.99	26.96
		Program		
		Head Start Present vs. Non-Head Start	-8.67	35.67
		Head Start Present vs. Head Start Absent	35.02	45.29
		Head Start Absent vs. Non-Head Start	-43.69	46.04
		Pretest Intake	0.39***	0.07
		Constant	407.99	
		Statistics F = 3.24 R^2 = 0.19 MS_e = 43692.10		

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Calories	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	573.74	295.25
		Head Start-Absent vs. Non-Head Start	-579.55*	249.92
		Pretest Intake	0.22*	0.10
		Constant	1166.40	
		Statistics F = 1.74 R^2 = 0.22	MS_e = 204565.64	
Calories	35	St. Clair		
		Head Start-Present vs. Non-Head Start	190.89	264.23
		Head Start-Present vs. Head Start-Absent	123.06	262.54
		Head Start-Absent vs. Non-Head Start	313.95	228.48
		Pretest Intake	0.21	0.15
		Constant	491.80	
		Statistics F = 1.82 R^2 = 0.39	MS_e = 258141.98	
Calories	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-193.89	225.32
		Head Start-Present vs. Head Start-Absent	121.87	204.65
		Head Start-Absent vs. Non-Head Start	-315.76	223.66
		Pretest Intake	0.36*	0.18
		Constant	2991.40	
		Statistics F = 1.71 R^2 = 0.28	MS_e = 338971.62	
Calories	33	Mingo		
		Head Start-Present vs. Non-Head Start	80.11	253.34
		Head Start-Present vs. Head Start-Absent	257.28	384.69
		Head Start-Absent vs. Non-Head Start	337.36	325.48
		Pretest Intake	0.52***	0.16
		Constant	648.41	
		Statistics F = 2.82 R^2 = 0.49.	MS_e = 884368.56	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Protein	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-3.15	6.40
		Head Start-Present vs. Head Start-Absent	26.14*	12.11
		Head Start-Absent vs. Non-Head Start	-20.44	12.10
		Pretest Intake	0.36***	0.11
		Constant	37.52	
	Statistics	$F = 2.65$ $R^2 = 0.4530$	$MS_e = 344.04$	
Protein	35	St. Clair		
		Head Start-Present vs. Non-Head Start	5.70	10.82
		Head Start-Present vs. Head Start-Absent	1.45	10.95
		Head Start-Absent vs. Non-Head Start	4.24	9.62
		Pretest Intake	0.30*	0.12
		Constant	16.63	
	Statistics	$F = 2.27$ $R^2 = 0.45.$	$MS_e = 443.01$	
Protein	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-1.56	7.21
		Head Start-Present vs. Head Start-Absent	10.98	65.22
		Head Start-Absent vs. Non-Head Start	-12.54	7.21
		Pretest Intake	0.23	0.14
		Constant	102.94	
	Statistics	$F = 2.13$ $R^2 = 0.32$	$MS_e = 343.17$	
Protein	33	Mingo		
		Head Start-Present vs. Non-Head Start	7.47	12.80
		Head Start-Present vs. Head Start-Absent	-19.59	19.20
		Head Start-Absent vs. Non-Head Start	27.06	16.25
		Pretest Intake	0.53	0.25
		Constant	12.10	
	Statistics	$F = 1.62$ $R^2 = 0.35$	$MS_e = 791.41$	

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[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Fat	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-3.15	6.40
		Head Start-Present vs. Head Start-Absent	33.54*	14.78
		Head Start-Absent vs. Non-Head Start	-36.69*	14.77
		Pretest Intake	0.15	0.10
		Constant	67.24	
	Statistics	F = 1.59 R^2 = 0.21	MS_e = 512.51	
Fat	35	St. Clair		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	-16.88	14.02
		Head Start-Absent vs. Non-Head Start	15.71	12.23
		Pretest Intake	0.25	0.15
		Constant	-13.75	
	Statistics	F = 1.78 R^2 = 0.21	MS_e = 741.58	
Fat	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-4.89	11.47
		Head Start-Present vs. Head Start-Absent	14.03	10.18
		Head Start-Absent vs. Non-Head Start	-18.91	11.23
		Pretest Intake	0.43	0.17
		Constant	104.76	
	Statistics	F = 2.33 R^2 = 0.34	MS_e = 839.97	
Fat	33	Mingo		
		Head Start-Present vs. Non-Head Start	2.08	15.88
		Head Start-Present vs. Head Start-Absent	-6.29	23.76
		Head Start-Absent vs. Non-Head Start	8.38	21.11
		Pretest Intake	0.46	0.22
		Constant	38.80	
	Statistics	F = 1.21 R^2 = 0.29	MS_e = 1360.30	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Carbohydrate	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	1.86	18.59
		Head Start-Present vs. Head Start-Absent	46.13	42.16
		Head Start-Absent vs. Non-Head Start	-44.27	42.12
		Pretest Intake	0.20*	0.10
		Constant	104.83	
	Statistics	F = 1.06 R^2 = 0.15	MS_e = 4167.53	
Carbohydrate	35	St. Clair		
		Head Start-Present vs. Non-Head Start	46.59	39.92
		Head Start-Present vs. Head Start-Absent	13.14	38.53
		Head Start-Absent vs. Non-Head Start	33.45	33.86
		Pretest Intake	0.22	0.21
		Constant	126.6 4	
	Statistics	F = 1.65 R^2 = 0.37	MS_e = 5489.55	
Carbohydrate	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-31.44	30.07
		Head Start-Present vs. Head Start-Absent	-8.86	27.64
		Head Start-Absent vs. Non-Head Start	-22.58	29.80
		Pretest Intake	0.28	0.17
		Constant	437.83	
	tatistics	F = 1.28 R^2 = 0.22	MS_e = 6157.46	
Carbohydrate	33	Mingo		
		Head Start-Present vs. Non-Head Start	32.63	25.10
		Head Start-Present vs. Head Start-Absent	11.05	38.47
		Head Start-Absent vs. Non-Head Start	21.58	32.70
		Pretest Intake	0.33	0.11
		Constant	79.29	
	Statistics	F = 3.96 R^2 = 0.57	MS_e = 3147.04	

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Calcium	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	345.52***	78.30
		Head Start-Present vs. Head Start-Absent	666.82	181.12
		Head Start-Absent vs. Non-Head Start	-321.29	180.99
		Pretest Intake	0.28*	0.12
		Constant	530.61	
	Statistics	$F = 3.85$ $R^2 = 0.39$	$MS_e = 76810.06$	
Calcium	65	St. Clair		
		Head Start-Present vs. Non-Head Start	50.64	194.18
		Head Start-Present vs. Head Start-Absent	185.49	195.25
		Head Start-Absent vs. Non-Head Start	-134.84	171.67
		Pretest Intake	0.40*	0.16
		Constant	-338.73	
	Statistics	$F = 2.15$ $R^2 = 0.44$	$MS_e = 142333.07$	
Calcium	50	Maricopa		
		Head Start-Present vs. Non-Head Start	98.93	148.84
		Head Start-Present vs. Head Start-Absent	338.73**	137.27
		Head Start-Absent vs. Non-Head Start	-239.80	147.52
		Pretest Intake	0.13	0.15
		Constant	1814.06	
	Statistics	$F = 1.35$ $R^2 = 0.23$	$MS_e = 151008.73$	
Calcium	33	Mingo		
		Head Start-Present vs. Non-Head Start	451.73*	212.71
		Head Start-Present vs. Head Start-Absent	695.33*	328.43
		Head Start-Absent vs. Non-Head Start	243.60	226.58
		Pretest Intake	0.43	0.24
		Constant	-129.64	
	Statistics	$F = 2.98$ $R^2 = 0.50$	$MS_e = 134322.86$	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Iron	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-2.34	1.35
		Head Start-Present vs. Head Start-Absent	2.25	3.12
		Head Start-Absent vs. Non-Head Start	-4.64*	2.22
		Pretest Intake	0.27***	0.08
		Constant	6.06	
	Statistics	F = 2.77 R^2 = 0.31	MS_e = 22.73	
Iron	65	St. Clair		
		Head Start-Present vs. Non-Head Start	1.58	2.73
		Head Start-Present vs. Head Start-Absent	-3.03	2.91
		Head Start-Absent vs. Non-Head Start	4.61*	2.32
		Pretest Intake	0.10	0.24
		Constant	9.49	
	Statistics	F = 1.01 R^2 = 0.27	MS_e = 26.60	
Iron	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-.70	1.55
		Head Start-Present vs. Head Start-Absent	0.69	1.42
		Head Start-Absent vs. Non-Head Start	-1.39	1.51
		Pretest Intake	0.22	1.35
		Constant	23.53	
	Statistics	F = 2.48 R^2 = 0.36	MS_e = 16.32	
Iron		Mingo		
		Head Start-Present vs. Non-Head Start	.36	1.66
		Head Start-Present vs. Head Start-Absent	-3.84	2.31
		Head Start-Absent vs. Non-Head Start	4.20	2.30
		Pretest Intake	0.38**	0.12
		Constant	-5.11	
	Statistics	F = 3.82 R^2 = 0.56	MS_e = 15.78	

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Anal ses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SL_b
Magnesium	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	38.03	17.15
		Head Start-Present vs. Head Start-Absent	107.58***	39.31
		Head Start-Absent vs. Non-Head Start	-69.56	39.43
		Pretest Intake	0.53***	0.09
		Constant	115.67	
	Statistics	F = 2.97 R^2 = 0.33	MS_e = 3623.21	
Magnesium	65	St. Clair		
		Head Start-Present vs. Non-Head Start	14.10*	30.52
		Head Start-Present vs. Head Start-Absent	64.49*	16.34
		Head Start-Absent vs. Non-Head Start	-50.39	28.96
		Pretest Intake	0.37***	0.09
		Constant	-17.49	
	Statistics	F = 5.09 R^2 = 0.80	MS_e = 3531.75	
Magnesium	50	Maricopa		
		Head Start-Present vs. Non-Head Start	20.70	24.89
		Head Start-Present vs. Head Start-Absent	50.44*	22.59
		Head Start-Absent vs. Non-Head Start	-29.68	24.68
		Pretest Intake	0.15*	0.12
		Constant	151.69	
	Statistics	F = 1.76 R^2 = 0.26	MS_e = 4115.70	
Magnesium		Mingo		
		Head Start-Present vs. Non-Head Start	53.33	29.99
		Head Start-Present vs. Head Start-Absent	21.28	48.50
		Head Start-Absent vs. Non-Head Start	32.04	41.47
		Pretest Intake	0.44*	0.18
		Constant	-21.60	
	Statistics	F = 3.44 R^2 = 0.53	MS_e = 4746.35	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Phosphorus	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	254.13*	100.20
		Head Start-Present vs. Head Start-Absent	658.08**	231.29
		Head Start-Absent vs. Non-Head Start	-403.96	231.14
		Pretest Intake	0.49	0.13
		Constant	639.52	
	Statistics	F = 3.40 R^2 = 0.36	MS_e = 125645.91	
Phosphorus	35	St. Clair		
		Head Start-Present vs. Non-Head Start	-134.30	163.18
		Head Start-Present vs. Head Start-Absent	104.42	82.83
		Head Start-Absent vs. Non-Head Start	-238.72	147.40
		Pretest Intake	0.48***	0.13
		Constant	47.76	
	atistics	F = 3.76 R^2 = 0.56	MS_e = 100351.99	
Phosphorus	49	Maricopa		
		Head Start-Present vs. Non-Head Start	54.61	130.59
		Head Start-Present vs. Head Start-Absent	256.0 *	119.84
		Head Start-Absent vs. Non-Head Start	-201.47	130.37
		Pretest Intake	0.23	0.13
		Constant	1484.99	
	Statistics	F = 2.00 R^2 = 0.31	MS_e = 115330.61	
Phosphorus	33	Mingo		
		Head Start-Present vs. Non-Head Start	125.88	226.08
		Head Start-Present vs. Head Start-Absent	does not enter eqn.	
		Head Start-Absent vs. Non-Head Start	147.53	280.67
		Pretest Intake	0.44*	0.18
		Constant	39.60	
	Statistics	F = 2.05 R^2 = 0.36	MS_e = 197222.27	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin A (Log)	63	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.05***	.132
		Head Start-Present vs. Head Start-Absent	0.58*	0.30
		Head Start-Absent vs. Non-Head Start	-1.25	0.30
		Pretest Intake	0.35**	0.13
		Constant	2.27	
	Statistics	$F = 2.56$ $R^2 = 0.31$	$MS_e = 0.21$	
Vitamin A (Log)	32	St. Clair		
		Head Start-Present vs. Non-Head Start	0.03*	0.14
		Head Start-Present vs. Head Start-Absent	0.26*	0.14
		Head Start-Absent vs. Non-Head Start	1.62	0.10
		Pretest Intake	0.31*	0.13
		Constant	1.37	
	Statistics	$F = 4.07$ $R^2 = 0.59$	$MS_e = 0.07$	
Vitamin A (Log)	49	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.03	0.10
		Head Start-Present vs. Head Start-Absent	1.61	0.10
		Head Start-Absent vs. Non-Head Start	1.96	0.11
		Pretest Intake	-0.52	0.12
		Constant	5.30	
	Statistics	$F = 0.99$ $R^2 = 0.19$	$MS_e = 0.07$	
Vitamin A (Log)	33	Mingo		
		Head Start-Present vs. Non-Head Start	0.03*	0.16
		Head Start-Present vs. Head Start-Absent	0.33	0.23
		Head Start-Absent vs. Non-Head Start	0.23	0.22
		Pretest Intake	-0.11	0.13
		Constant	3.23	
	Statistics	$F = 1.18$ $R^2 = 0.28$	$MS_e = 0.15$	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Thiamin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.22	0.16
		Head Start-Present vs. Head Start-Absent	1.97	0.36
		Head Start-Absent vs. Non-Head Start	-0.42	0.26
		Pretest Intake	0.14	0.10
		Constant	0.59	
	Statistics	F = 0.88 R^2 = 0.13	MS_e = 0.30	
Thiamin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	0.25	0.29
		Head Start-Present vs. Head Start-Absent	1.40	0.31
		Head Start-Absent vs. Non-Head Start	0.11	0.28
		Pretest Intake	-0.95	0.16
		Constant	0.67	
	Statistics	F = 0.68 R^2 = 0.20	MS_e = 0.35	
Thiamin	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-1.52	0.21
		Head Start-Present vs. Head Start-Absent	0.07	0.19
		Head Start-Absent vs. Non-Head Start	-0.22	0.21
		Pretest Intake	0.22	0.20
		Constant	4.08	
	Statistics	F = 1.29 R^2 = 0.22	MS_e = 0.30	
Thiamin	33	Mingo		
		Head Start-Present vs. Non-Head Start	1.07	0.23
		Head Start-Present vs. Head Start-Absent	does not	enter equation
		Head Start-Absent vs. Non-Head Start	1.26	3.18
		Pretest Intake	0.53***	0.16
		Constant	-0.93	
	Statistics	F = 3.21 R^2 = 0.47	MS_e = 0.29	

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[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

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Table 6-9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Riboflavin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.78*	0.38
		Head Start-Present vs. Head Start-Absent	1.13	0.88
		Head Start-Absent vs. Non-Head Start	-0.04	0.88
		Pretest Intake	0.46*	0.18
		Constant	0.88	
	Statistics	F = 2.20 R^2 = 0.26	MS_e = 1.82	
Riboflavin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	0.31	0.30
		Head Start-Present vs. Head Start-Absent	0.41	0.30
		Head Start-Absent vs. Non-Head Start	-0.99	0.27
		Pretest Intake	0.50**	0.17
		Constant	0.14	
	Statistics	F = 3.45 R^2 = 0.55	MS_e = 0.34	
Riboflavin	30	Maricopa		
		Head Start-Present vs. Non-Head Start	1.47	0.31
		Head Start-Present vs. Head Start-Absent	0.51	0.29
		Head Start-Absent vs. Non-Head Start	-0.37	0.32
		Pretest Intake	0.14	0.17
		Constant	4.84	
	Statistics	F = 1.12 R^2 = 0.20	MS_e = 0.67	
Riboflavin	33	Mingo		
		Head Start-Present vs. Non-Head Start	0.27	0.42
		Head Start-Present vs. Head Start-Absent	0.46	0.53
		Head Start-Absent vs. Non-Head Start	-1.85	0.53
		Pretest Intake	0.34	0.21
		Constant	-1.00	
	Statistics	F = 1.61 R^2 = 0.35	MS_e = 0.81	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Niacin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-1.33	2.07
		Head Start-Present vs. Head Start-Absent	2.24	4.78
		Head Start-Absent vs. Non-Head Start	-3.57	4.77
		Pretest Intake	0.30**	0.10
		Constant	6.41	
	Statistics	F = 1.89 R^2 = 0.24	MS_e = 53.57	
Niacin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	4.91	3.76
		Head Start-Present vs. Head Start-Absent	2.00	3.82
		Head Start-Absent vs. Non-Head Start	2.90	3.31
		Pretest Intake	0.25	0.17
		Constant	7.55	
	Statistics	F = 0.98 R^2 = 0.26	MS_e = 53.40	
Niacin	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.96	2.37
		Head Start-Present vs. Head Start-Absent	does not enter eqn.	
		Head Start-Absent vs. Non-Head Start	-0.94	2.38
		Pretest Intake	0.20	0.20
		Constant	38.87	
	Statistics	F = 1.54 R^2 = 0.23	MS_e = 35.65	
Niacin	33	Mingo		
		Head Start-Present vs. Non-Head Start	3.76	3.38
		Head Start-Present vs. Head Start-Absent	-2.48	4.61
		Head Start-Absent vs. Non-Head Start	6.24	4.71
		Pretest Intake	0.48	0.21
		Constant	-10.83	
	Statistics	F = 2.37 R^2 = 0.44	MS_e = 62.93	

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[a] Significance shown as:
$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_6	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-1.10	0.18
		Head Start-Present vs. Head Start-Absent	0.24	0.41
		Head Start-Absent vs. Non-Head Start	-0.44	0.41
		Pretest Intake	0.10	0.08
		Constant	0.72	
	Statistics	F = 0.73 R^2 = 0.11	MS_e = 0.39	
Vitamin B_6	35	St. Clair		
		Head Start-Present vs. Non-Head Start	0.26	0.28
		Head Start-Present vs. Head Start-Absent	0.37	0.29
		Head Start-Absent vs. Non-Head Start	-1.10	0.26
		Pretest Intake	0.55***	0.13
		Constant	0.42	
	Statistics	F = 4.17 R^2 = 0.60	MS_e = 0.29	
Vitamin B_6	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.40	0.22
		Head Start-Present vs. Head Start-Absent	0.85	0.21
		Head Start-Absent vs. Non-Head Start	-1.25	0.22
		Pretest Intake	0.17	0.17
		Constant	4.17	
	Statistics	F = 1.66 R^2 = 0.27	MS_e = 0.33	
Vitamin B_6	33	Mingo		
		Head Start-Present vs. Non-Head Start	1.40	0.24
		Head Start-Present vs. Head Start-Absent	-1.46	0.34
		Head Start-Absent vs. Non-Head Start	0.28	0.30
		Pretest Intake	0.29	0.13
		Constant	-1.58	
	Statistics	F = 2.33 R^2 = 0.44	MS_e = 0.34	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_{12} (Log)	63	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.42***	0.17
		Head Start-Present vs. Head Start-Absent	0.80**	0.30
		Head Start-Absent vs. Non-Head Start	-0.38	0.30
		Pretest Intake	0.30	0.16
		Constant	0.63	
	Statistics	F = 2.62 R^2 = 0.31	MS_e = 0.21	
Vitamin B_{12} (Log)	32	St. Clair		
		Head Start-Present vs. Non-Head Start	0.68	0.10
		Head Start-Present vs. Head Start-Absent	-1.10	0.09
		Head Start-Absent vs. Non-Head Start	0.43	0.08
		Pretest Intake	0.30	0.16
		Constant	0.24	
	Statistics	F = 3.46 R^2 = 0.55	MS_e = 0.03	
Vitamin B_{12} (Log)	48	Maricopa		
		Head Start-Present vs. Non-Head Start	0.08	0.08
		Head Start-Present vs. Head Start-Absent	0.88	0.07
		Head Start-Absent vs. Non-Head Start	-1.25	0.08
		Pretest Intake	0.14	0.10
		Constant	1.18	
	Statistics	F = 0.95 R^2 = 0.18	MS_e = 0.04	
Vitamin B_{12} (Log)	33	Mingo		
		Head Start-Present vs. Non-Head Start	1.36	0.13
		Head Start-Present vs. Head Start-Absent	-0.31	0.17
		Head Start-Absent vs. Non-Head Start	1.71	0.18
		Pretest Intake	-0.54	0.13
		Constant	-0.27	
	Statistics	F = 1.20 R^2 = 0.25	MS_e = 0.10	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -9 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin C	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-32.33	3.82
		Head Start-Present vs. Head Start-Absent	25.74	55.04
		Head Start-Absent vs. Non-Head Start	-58.09	55.27
		Pretest Intake	0.15	0.14
		Constant	-23.25	
	Statistics	F = 0.89 R^2 = 0.13	MS_e = 7042.90	
Vitamin C	35	St. Clair		
		Head Start-Present vs. Non-Head Start	104.73	62.17
		Head Start-Present vs. Head Start-Absent	46.70	64.02
		Head Start-Absent vs. Non-Head Start	58.03	54.82
		Pretest Intake	0.33	0.26
		Constant	273.96	
	Statistics	F = 1.37 R^2 = 0.33	MS_e = 14489.43	
Vitamin C	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-40.68	28.94
		Head Start-Present vs. Head Start-Absent	-2.88	12.47
		Head Start-Absent vs. Non-Head Start	-37.79	28.73
		Pretest Intake	0.18	0.14
		Constant	634.72	
	Statistics	F = 1.55 R^2 = 0.26	MS_e = 5661.60	
Vitamin C	33	Mingo		
		Head Start-Present vs. Non-Head Start	6.21	23.79
		Head Start-Present vs. Head Start-Absent	-20.35	35.37
		Head Start-Absent vs. Non-Head Start	26.56	34.07
		Pretest Intake	0.55	0.15
		Constant	-97.87	
	Statistics	F = 3.06 R^2 = 0.50	MS_e = 3612.90	

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[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Protein	181	Greene & Humphreys	2.33	1.24
		St. Clair	-0.39	1.45
		Maricopa	-1.90	1.57
		Mingo	0.28	0.54
		Program		
		Head Start Present vs. Non-Head Start	3.28*	1.60
		Head Start Present vs. Head Start Absent	2.18	2.06
		Head Start Absent vs. Non-Head Start	1.10	2.11
		Pretest Intake	0.61	0.06
		Constant	31.95	
		Statistics $F = 1.26$ $R^2 = 0.08$ $MS_e = 87.503$		
		Site		
Calcium	181	Greene & Humphreys	-10.44	24.23
		St. Clair	-58.36*	27.56
		Maricopa	15.49	30.36
		Mingo	53.31*	21.97
		Program		
		Head Start Present vs. Non-Head Start	166.17***	30.80
		Head Start Present vs. Head Start Absent	179.78***	39.08
		Head Start Absent vs. Non-Head Start	-13.62	39.48
		Pretest Intake	0.12*	0.04
		Constant	340.32	
		Statistics $F = 5.21$ $R^2 = 0.27$ $MS_e = 31613.45$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10 (continued)

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Iron	183	Greene & Humphreys	0.62	0.49
		St. Clair	0.16	0.57
		Maricopa	doesn't enter equation	
		Mingo	-0.78	0.20
		Program		
		Head Start Present vs. Non-Head Start	1.69	0.68
		Head Start Present vs. Head Start Absent	0.42	0.82
		Head Start Absent vs. Non-Head Start	0.27	0.88
		Pretest Intake	-0.14	0.09
		Constant	9.47	
		Statistics F = 1.15 R^2 = 0.07 MS_e = 16.26		
		Site		
Magnesium	181	Greene & Humphreys	0.48	3.57
		St. Clair	-1.49	4.20
		Maricopa	-8.84*	4.31
		Mingo	9.85	2.29
		Program		
		Head Start Present vs. Non-Head Start	22.09***	4.62
		Head Start Present vs. Head Start Absent	25.26***	5.95
		Head Start Absent vs. Non-Head Start	-3.16	6.50
		Pretest Intake	0.68	0.05
		Constant	101.92	
		Statistics F = 5.30 R^2 = 0.27 MS_e = 733.56		

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10 (continued)

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Phosphorus	181	Greene & Humphreys	15.92	22.05
		St. Clair	-60.67*	25.29
		Maricopa	-17.85	27.16
		Mingo	58.60*	20.25
		Program		
		Head Start Present vs. Non-Head Start	106.62***	28.03
		Head Start Present vs. Head Start Absent	136.52***	35.42
		Head Start Absent vs. Non-Head Start	29.92***	18.03
		Pretest Intake	0.82	0.06
		Constant	494.58	
		Statistics $F = 3.61$ $R^2 = 0.20$ $MS_e = 26486.89$		
		Site		
Vitamin A	192	Greene & Humphreys	1398.39**	465.78
		St. Clair	-671.49	528.51
		Maricopa	-384.62	573.26
		Mingo	342.28	247.78
		Program		
		Head Start Present vs. Non-Head Start	2577.80***	597.42
		Head Start Present vs. Head Start Absent	1919.36*	787.62
		Head Start Absent vs. Non-Head Start	658.46	782.44
		Pretest Intake	0.55	0.06
		Constant	3826.35	
		Statistics $F = 3.18$ $R^2 = 0.18$ $MS_e = 13092533.57$		

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[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10 (continued)

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Thiamin	183	Greene & Humphreys	0.19***	0.06
		St. Clair	0.84	0.07
		Maricopa	-0.83	-0.07
		Mingo	-0.20	0.10
		Program		
		Head Start Present vs. Non-Head Start	.030	0.07
		Head Start Present vs. Head Start Absent	does not enter equation	
		Head Start Absent vs. Non-Head Start	-0.35	0.09
		Pretest Intake	-0.17	0.09
		Constant	0.84	
		Statistics F = 1.71 R^2 = 0.11 MS_e = 0.18		
		Site		
Riboflavin	183	Greene & Humphreys	-0.25*	0.12
		St. Clair	-0.75	0.14
		Maricopa	0.29*	0.15
		Mingo	0.71	0.14
		Program		
		Head Start Present vs. Non-Head Start	0.96	0.15
		Head Start Present vs. Head Start Absent	does not enter equation	
		Head Start Absent vs. Non-Head Start	1.06	0.20
		Pretest Intake	-0.13	0.13
		Constant	2.35	
		Statistics F = 1.55 R^2 = 0.10 MS_e = 0.82		

[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10 (continued)

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Niacin	183	Greene & Humphreys	1.66*	0.76
		St. Clair	does not enter equation	
		Maricopa	−0.74	0.88
		Mingo	−0.92	0.54
		Program		
		Head Start Present vs. Non-Head Start	0.54	0.96
		Head Start Present vs. Head Start Absent	1.51	1.24
		Head Start Absent vs. Non-Head Start	−0.97	1.26
		Pretest Intake	0.85	0.10
		Constant	7.41	
		Statistics F = 1.58 R^2 = 0.09 MS_e = 32.26		
		Site		
Vitamin B6	183	Greene & Humphreys	0.15**	0.06
		St. Clair	does not enter equation	
		Maricopa	−0.21**	0.67
		Mingo	0.06	0.10
		Program		
		Head Start Present vs. Non-Head Start		
		Head Start Present vs. Head Start Absent	1.83	0.09
		Head Start Absent vs. Non-Head Start	1.57	0.09
		Pretest Intake	−0.35	0.07
		Constant	0.30	
		Statistics F = 1.81 R^2 = 0.10 MS_e = 0.19		

[a] Significance shown as:

$*p \lesssim .05$
$**p \lesssim .01$
$***p \lesssim .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -10 (continued)

Regression Analyses[a] of Total Nutrient Density for Longitudinal and non-Head Start Children (Sample A) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Vitamin B_{12}	193	Greene & Humphreys	2.62	1.44
		St. Clair	2.71	1.65
		Maricopa	-3.27*	1.77
		Mingo	-2.06	1.70
		Program		
		Head Start Present vs. Non-Head Start	1.13*	0.06
		Head Start Present vs. Head Start Absent	2.62	1.13
		Head Start Absent vs. Non-Head Start	-3.82	2.41
		Pretest Intake	0.46	0.17
		Constant	-9.99	
		Statistics $F = 1.98$ $R^2 = 0.12$ $MS_e = 125.63$		
		Site		
Vitamin C	180	Greene & Humphreys	11.27	6.36
		St. Clair	24.17**	7.72
		Maricopa	-18.86*	8.31
		Mingo	-16.58*	3.56
		Program		
		Head Start Present vs. Non-Head Start	-3.96*	1.85
		Head Start Present vs. Head Start Absent	-4.36	10.36
		Head Start Absent vs. Non-Head Start	3.12	11.01
		Pretest Intake	0.25***	0.06
		Constant	37.47	
		Statistics $F = 3.47$ $R^2 = 0.20$ $MS_e = 2441.62$		

[a] Significance shown as:

$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Protein	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	4.06	2.09
		Head Start-Present vs. Head Start-Absent	6.70	4.80
		Head Start-Absent vs. Non-Head Start	-2.64	4.60
		Pretest Intake	0.30	0.06
		Constant	36.93	
	Statistics	F = 1.17 R^2 = 0.19	MS_e = 54.18	
Protein	35	St. Clair		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	4.30	5.04
		Head Start-Absent vs. Non-Head Start	-3.88	4.35
		Pretest Intake	0.16	4.35
		Constant	28.84	
	Statistics	F = 0.56 R^2 = 0.17	MS_e = 82.54	
Protein	49	Maricopa		
		Head Start-Present vs. Non-Head Start	7.71	4.90
		Head Start-Present vs. Head Start-Absent	1.82	4.54
		Head Start-Absent vs. Non-Head Start	5.90	5.08
		Pretest Intake	0.13	0.19
		Constant	7.46	
	Statistics	F = 0.47 R^2 = 0.09	MS_e = 156.92	
Protein	32	Mingo		
		Head Start-Present vs. Non-Head Start	2.63	3.34
		Head Start-Present vs. Head Start-Absent	does not enter equation	
		Head Start-Absent vs. Non-Head Start	3.07	5.46
		Pretest Intake	0.63	0.20
		Constant	32.34	
	Statistics	F = 1.63 R^2 = 0.32	MS_e = 67.73	

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[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Calcium	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	253.70***	39.53
		Head Start-Present vs. Head Start-Absent	316.37***	90.05
		Head Start-Absent vs. Non-Head Start	62.66	91.19
		Pretest Intake	0.21	0.10
		Constant	346.50	
	Statistics	F = 6.65 R^2 = 0.09	MS_e = 33093.43	
Calcium	35	St. Clair		
		Head Start-Present vs. Non-Head Start	57.73	102.12
		Head Start-Present vs. Head Start-Absent	185.48	104.92
		Head Start-Absent vs. Non-Head Start	-127.76	91.89
		Pretest Intake	0.41**	0.16
		Constant	32.27	
	Statistics	F = 1.37 R^2 = 0.33	MS_e = 39483.41	
Calcium	48	Maricopa		
		Head Start-Present vs. Non-Head Start	119.62	78.06
		Head Start-Present vs. Head Start-Absent	115.66	73.32
		Head Start-Absent vs. Non-Head Start does	not enter	equation
		Pretest Intake	0.58	0.14
		Constant	88.62	
	Statistics	F = 0.67 R^2 = 0.14	MS_e = 38437.71	
Calcium	33	Mingo		
		Head Start-Present vs. Non-Head Start	186.15*	91.98
		Head Start-Present vs. Head Start-Absent	326.08*	140.02
		Head Start-Absent vs. Non-Head Start	-139.93	122.64
		Pretest Intake	-0.17	
		Constant	432.10	
	Statistics	F = 1.24 R^2 = 0.29	MS_e = 44997.48	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Iron	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.82	1.22
		Head Start-Present vs. Head Start-Absent	2.34	2.82
		Head Start-Absent vs. Non-Head Start	4.24	2.82
		Pretest Intake	0.15	0.13
		Constant	5.57	
	Statistics	$F = 1.18$ $R^2 = 0.16$	$MS_e = 18.55$	
Iron	35	St. Clair		
		Head Start-Present vs. Non-Head Start	-1.58	2.02
		Head Start-Present vs. Head Start-Absent	-2.14	2.32
		Head Start-Absent vs. Non-Head Start	0.57	1.71
		Pretest Intake	-0.59	0.36
		Constant	15.26	
	Statistics	$F = 0.85$ $R^2 = 0.23$	$MS_e = 12.93$	
Iron	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.32	1.34
		Head Start-Present vs. Head Start-Absent	-1.49	1.22
		Head Start-Absent vs. Non-Head Start	1.17	1.33
		Pretest Intake	-0.86	0.15
		Constant	5.20	
	Statistics	$F = 0.80$ $R^2 = 0.13$	$MS_e = 12.32$	
Iron	33	Mingo		
		Head Start-Present vs. Non-Head Start	-0.99	1.60
		Head Start-Present vs. Head Start-Absent	7.94**	2.68
		Head Start-Absent vs. Non-Head Start	-8.93***	2.62
		Pretest Intake	-0.16	0.26
		Constant	11.23	
	Statistics	$F = 2.56$ $R^2 = 0.46$	$MS_e = 16.40$	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Magnesium	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	26.38***	7.26
		Head Start-Present vs. Head Start-Absent	40.16*	16.88
		Head Start-Absent vs. Non-Head Start	-13.76	16.90
		Pretest Intake	0.47	0.09
		Constant	128.82	
	Statistics	F = 3.34 R^2 = 0.35	MS_e = 662.67	
Magnesium	35	St. Clair		
		Head Start-Present vs. Non-Head Start	29.12***	8.34
		Head Start-Present vs. Head Start-Absent	46.83**	14.94
		Head Start-Absent vs. Non-Head Start	-40.56**	12.98
		Pretest Intake	0.30**	0.09
		Constant	47.26	
	Statistics	F = 2.90 R^2 = 0.51	MS_e = 584.14	
Magnesium	49	Maricopa		
		Head Start-Present vs. Non-Head Start	29.16**	11.28
		Head Start-Present vs. Head Start-Absent	22.56*	10.54
		Head Start-Absent vs. Non-Head Start	6.60	11.44
		Pretest Intake	-0.25	0.13
		Constant	1.19	
	Statistics	F = 1.83 R^2 = 0.30	MS_e = 822.99	
Magnesium	32	Mingo		
		Head Start-Present vs. Non-Head Start	17.82	11.59
		Head Start-Present vs. Head Start-Absent	15.81	18.10
		Head Start-Absent vs. Non-Head Start	2.00	17.33
		Pretest Intake	-0.15	0.19
		Constant	120.46	
	Statistics	F = 1.03 R^2 = 0.26	MS_e = 856.26	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Phosphorus	64	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	190.00***	42.98
		Head Start-Present vs. Head Start-Absent	272.70**	98.22
		Head Start-Absent vs. Non-Head Start	-82.66	97.82
		Pretest Intake	-0.18	0.11
		Constant	620.78	
	Statistics	$F = 3.69$ $R^2 = 0.38$	$MS_e = 22444.46$	
Phosphorus	35	St. Clair		
		Head Start-Present vs. Non-Head Start	124.54*	48.80
		Head Start-Present vs. Head Start-Absent	156.67	88.49
		Head Start-Absent vs. Non-Head Start	-217.01**	78.93
		Pretest Intake	0.48	0.16
		Constant	256.08	
	Statistics	$F = 1.93$ $R^2 = 0.41$	$MS_e = 25288.55$	
Phosphorus	49	Maricopa		
		Head Start-Present vs. Non-Head Start	127.92*	57.18
		Head Start-Present vs. Head Start-Absent	109.64*	53.06
		Head Start-Absent vs. Non-Head Start	18.30	57.76
		Pretest Intake	-0.47	0.11
		Constant	390.09	
	Statistics	$F = 0.90$ $R^2 = 0.17$	$MS_e = 21116.72$	
Phosphorus	33	Mingo		
		Head Start-Present vs. Non-Head Start	47.66	81.56
		Head Start-Present vs. Head Start-Absent	90.58	115.94
		Head Start-Absent vs. Non-Head Start	-40.96	118.12
		Pretest Intake	0.68	0.21
		Constant	422.32	
	Statistics	$F = 0.72$ $R^2 = 0.17$	$MS_e = 39270.04$	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin A	68	Gruene & Humphreys		
		Head Start-Present vs. Non-Head Start	5120.00***	1521.02
		Head Start-Present vs. Head Start-Absent	6315.67	3620.34
		Head Start-Absent vs. Non-Head Start	1195.56	3561.94
		Pretest Intake	0.54	0.27
		Constant	7113.04	
		Statistics F = 1.84 R^2 = 0.22	MS_e = 31494759.62	
Vitamin A	39	St. Clair		
		Head Start-Present vs. Non-Head Start	1970.86***	621.72
		Head Start-Present vs. Head Start-Absent	1637.34*	714.94
		Head Start-Absent vs. Non-Head Start	333.51	629.74
		Pretest Intake	0.14	0.08
		Constant	119.59	
		Statistics F = 2.11 R^2 = 0.40	MS_e = 2115666.93	
Vitamin A	53	Maricopa		
		Head Start-Present vs. Non-Head Start	144.15	576.81
		Head Start-Present vs. Head Start-Absent	129.60	533.88
		Head Start-Absent vs. Non-Head Start	does not enter equation	
		Pretest Intake	-0.30	0.05
		Constant	5798.62	
		Statistics F = 0.32 R^2 = 0.06	MS_e = 2337364.14	
Vitamin A	32	Mingo		
		Head Start-Present vs. Non-Head Start	1392.82	529.61
		Head Start-Present vs. Head Start-Absent	573.14	828.54
		Head Start-Absent vs. Non-Head Start	819.68	818.77
		Pretest Intake	0.34	0.04
		Constant	2956.41	
		Statistics F = 1.59 R^2 = 0.32	MS_e = 1773399.30	

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[a] Significance shown as:
$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Thiamin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.86	0.08
		Head Start-Present vs. Head Start-Absent	0.32	0.18
		Head Start-Absent vs. Non-Head Start	0.23	0.18
		Pretest Intake	-0.60	0.18
		Constant	0.69	
	Statistics	F = 0.79 R^2 = 0.11	MS_e = 0.08	
Thiamin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	0.55	0.21
		Head Start-Absent vs. Non-Head Start	-0.36	0.18
		Pretest Intake	-0.14	0.21
		Constant	1.20	
	Statistics	F = 1.94 R^2 = 0.37	MS_e = 0.14	
Thiamin	50	Maricopa		
		Head Start-Present vs. Non-Head Start	-1.46	0.16
		Head Start-Present vs. Head Start-Absent	-0.54	0.15
		Head Start-Absent vs. Non-Head Start	-0.92	0.16
		Pretest Intake	-0.34	0.24
		Constant	0.33	
	Statistics	F = 1.79 R^2 = 0.29	MS_e = 0.18	
Thiamin	33	Mingo		
		Head Start-Present vs. Non-Head Start	0.23	0.24
		Head Start-Present vs. Head Start-Absent	0.36	0.39
		Head Start-Absent vs. Non-Head Start	-1.31	0.38
		Pretest Intake	0.21	0.34
		Constant	1.37	
	Statistics	F = 0.96 R^2 = 0.24	MS_e = 0.37	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Riboflavin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.45	0.34
		Head Start-Present vs. Head Start-Absent	-0.51	0.81
		Head Start-Absent vs. Non-Head Start	does not enter equation	
		Pretest Intake	-0.20	0.31
		Constant	3.21	
	Statistics	F = 1.69 R^2 = 0.22	MS_e = 1.52	
Riboflavin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	1.70	0.15
		Head Start-Present vs. Head Start-Absent	0.34*	0.15
		Head Start-Absent vs. Non-Head Start	-1.71	0.14
		Pretest Intake	0.27*	0.13
		Constant	0.56	
	Statistics	F = 1.62 R^2 = 0.33	MS_e = 0.08	
Riboflavin	50	Maricopa		
		Head Start-Present vs. Non-Head Start	0.40*	0.19
		Head Start-Present vs. Head Start-Absent	0.24	0.18
		Head Start-Absent vs. Non-Head Start	1.52	0.19
		Pretest Intake	-0.26	0.16
		Constant	5.91	
	Statistics	F = 2.64 R^2 = 0.37	MS_e = 0.25	
Riboflavin	33	Mingo		
		Head Start-Present vs. Non-Head Start	0.50	0.38
		Head Start-Present vs. Head Start-Absent	1.24	0.58
		Head Start-Absent vs. Non-Head Start	0.64	0.60
		Pretest Intake	-0.31	0.33
		Constant	1.66	
	Statistics	F = 0.73 R^2 = 0.17	MS_e = 0.89	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Niacin	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	1.66	1.44
		Head Start-Present vs. Head Start-Absent	2.71	3.32
		Head Start-Absent vs. Non-Head Start	1.05	3.32
		Pretest Intake	0.83	0.13
		Constant	6.59	
	Statistics	F = 0.91 R^2 = 0.13	MS_e = 25.91	
Niacin	35	St. Clair		
		Head Start-Present vs. Non-Head Start	2.42	2.16
		Head Start-Present vs. Head Start-Absent	5.28*	2.28
		Head Start-Absent vs. Non-Head Start	-2.84	1.92
		Pretest Intake	0.34	0.21
		Constant	10.04	
	Statistics	F = 1.18 R^2 = 0.30	MS_e = 17.34	
Niacin	50	Maricopa		
		Head Start-Present vs. Non-Head Start	2.27	2.41
		Head Start-Present vs. Head Start-Absent	does not	enter equation
		Head Start-Absent vs. Non-Head Start	2.07	2.41
		Pretest Intake	0.94	0.30
		Constant	-3.84	
	Statistics	F = 0.41 R^2 = 0.07	MS_e = 37.90	
Niacin	33	Mingo		
		Head Start-Present vs. Non-Head Start	2.24	2.74
		Head Start-Present vs. Head Start-Absent	13.84**	5.00
		Head Start-Absent vs. Non-Head Start	-11.59*	5.13
		Pretest Intake	0.85*	0.40
		Constant	13.59	
	Statistics	F = 1.67 R^2 = 0.36	MS_e = 47.31	

[a] Significance shown as:
$^*p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_6	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	-0.59	0.26
		Head Start-Absent vs. Non-Head Start	0.67	0.26
		Pretest Intake	-0.30	0.09
		Constant	0.68	
	Statistics	F = 0.69 R^2 = 0.10	MS_e = 0.16	
Vitamin B_6	35	St. Clair		
		Head Start-Present vs. Non-Head Start	1.03	0.12
		Head Start-Present vs. Head Start-Absent	0.23	0.13
		Head Start-Absent vs. Non-Head Start	-1.28	0.11
		Pretest Intake	0.27*	0.11
		Constant	0.42	
	Statistics	F = 1.71 R^2 = 0.38	MS_e = 0.05	
Vitamin B_6	30	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.27	0.24
		Head Start-Present vs. Head Start-Absent	0.38	0.22
		Head Start-Absent vs. Non-Head Start	1.06	0.23
		Pretest Intake	0.41	0.33
		Constant	1.00	
	Statistics	F = 1.13 R^2 = 0.20	MS_e = 0.38	
Vitamin B_6	33	Mingo		
		Head Start-Present vs. Non-Head Start	-1.73	0.12
		Head Start-Present vs. Head Start-Absent	-0.39*	0.09
		Head Start-Absent vs. Non-Head Start	0.36	0.18
		Pretest Intake	-0.13	0.13
		Constant	-0.23	
	Statistics	F = 1.89 R^2 = 0.39	MS_e = 0.09	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_{12}	68	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-4.18	3.68
		Head Start-Present vs. Head Start-Absent	-2.92	8.62
		Head Start-Absent vs. Non-Head Start	-1.27	8.59
		Pretest Intake	0.16	0.78
		Constant	3.18	
	Statistics	F = 1.38 R^2 = 0.18	MS_e = 187.06	
Vitamin B_{12}	35	St. Clair		
		Head Start-Present vs. Non-Head Start	11.18**	4.04
		Head Start-Present vs. Head Start-Absent	3.80	4.40
		Head Start-Absent vs. Non-Head Start	-4.62	4.29
		Pretest Intake	-1.90	2.21
		Constant	-24.36	
	Statistics	F = 3.78 R^2 = 0.54	MS_e = 83.01	
Vitamin B_{12}	53	Maricopa		
		Head Start-Present vs. Non-Head Start	-3.28	3.43
		Head Start-Present vs. Head Start-Absent	1.86	3.16
		Head Start-Absent vs. Non-Head Start	-5.16	3.37
		Pretest Intake	-0.17	0.23
		Constant	30.35	
	Statistics	F = 0.75 R^2 = 0.14	MS_e = 81.86	
Vitamin B_{12}	32	Mingo		
		Head Start-Present vs. Non-Head Start	1.55	3.97
		Head Start-Present vs. Head Start-Absent	does not	enter equation
		Head Start-Absent vs. Non-Head Start	-1.55	6.01
		Pretest Intake	0.12	0.24
		Constant	-7.30	
	Statistics	F = 0.52 R^2 = 0.13	MS_e = 96.93	

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[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-11 (continued)

Regression Analyses[a] of Nutrient Density for Longitudinal Head Start and non-Head Start Children (Sample A) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin C	65	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-28.24*	13.92
		Head Start-Present vs. Head Start-Absent	-17.72	33.26
		Head Start-Absent vs. Non-Head Start	-10.32	32.50
		Pretest Intake	0.23*	0.11
		Constant	-18.20	
	Statistics	F = 1.62 R^2 = 0.21	MS_e = 2014.16	
Vitamin C	34	St. Clair		
		Head Start-Present vs. Non-Head Start	-14.73	18.88
		Head Start-Present vs. Head Start-Absent	43.08	29.78
		Head Start-Absent vs. Non-Head Start	7.30	18.95
		Pretest Intake	0.39*	0.16
		Constant	188.89	
	Statistics	F = 1.10 R^2 = 0.43	MS_e = 3006.39	
Vitamin C	48	Maricopa		
		Head Start-Present vs. Non-Head Start	65.02*	28.34
		Head Start-Present vs. Head Start-Absent	-7.42	17.23
		Head Start-Absent vs. Non-Head Start	21.93	25.46
		Pretest Intake	0.11	0.13
		Constant	362.28	
	Statistics	F = 0.88 R^2 = 0.17	MS_e = 2377.95	
Vitamin C	33	Mingo		
		Head Start-Present vs. Non-Head Start	does not enter equation	
		Head Start-Present vs. Head Start-Absent	20.52	24.70
		Head Start-Absent vs. Non-Head Start	21.89	23.10
		Pretest Intake	0.36*	0.17
		Constant	-18.05	
	Statistics	F = 1.63 R^2 = 0.35	MS_e = 1570.02	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -12

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those present on Day of Recall and Non-Head Start Children across Sites

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	308	1423.	1691.	2104.	1776.	502.	309	1235.	1536.	1899.	1584.	501.	4.75	0.000
PROTEIN (GM)	307	51.53	64.86	80.82	67.53	21.40	313	38.17	52.84	69.34	55.63	21.90	6.85	0.000
FAT (GM)	302	53.74	66.14	85.55	70.25	23.20	310	48.64	66.58	82.08	66.96	25.90	1.65	0.099
CARBOHYDRATE (GM)	309	175.71	211.66	260.86	223.38	67.70	306	145.89	187.36	231.07	191.91	66.60	5.81	0.000
CALCIUM (MG)	307	764.	966.	1217.	1015.	364.	310	425.	637.	864.	680.	346.	11.73	0.000
IRON (MG)	304	8.32	10.74	13.57	11.27	3.93	302	7.24	9.74	12.33	10.18	4.06	3.37	0.001
MAGNESIUM (MG)	307	181.82	220.69	286.58	242.03	81.60	311	129.57	172.44	230.80	185.00	78.60	8.85	0.000
PHOSPHORUS (MG)	309	938.	1176.	1462.	1225.	397.	310	665.	895.	1162.	947.	387.	8.80	0.000
LOG VITAMIN A (IU)	309	3.45	3.66	3.93	3.70	0.36	300	3.24	3.42	3.61	3.44	0.32	9.54	0.000
VITAMIN A (IU)	309	2789.	4567.	8526.	7250.	8195.	300	1722.	2641.	4050.	3724.	4127.	6.93	0.000
THIAMIN (MG)	306	0.95	1.21	1.65	1.32	0.51	302	0.78	1.10	1.48	1.18	0.53	3.34	0.001
RIBOFAVIN (MG)	301	1.51	1.96	2.50	2.07	0.75	305	1.04	1.45	1.95	1.55	0.68	9.00	0.000
NIACIN (MG)	305	10.18	13.74	18.07	14.72	5.99	308	8.62	12.52	17.30	13.67	6.55	2.07	0.039
VITAMIN B6 (MG)	302	0.99	1.23	1.64	1.35	0.53	306	0.70	1.13	1.55	1.17	0.56	4.06	0.000
LOG VIT. B12 (MCG)	288	0.46	0.60	0.71	0.58	0.22	305	0.28	0.43	0.58	0.41	0.28	8.50	0.000
VITAMIN B12 (MCG)	288	2.90	3.98	5.10	4.40	2.58	305	1.89	2.69	3.83	3.05	1.78	7.35	0.000
VITAMIN C (MG)	302	63.08	113.29	179.73	129.06	81.50	308	35.67	86.03	151.26	108.91	91.50	2.87	0.004
CHOLESTEROL (MG)	306	193.08	290.59	456.54	342.86	194.00	308	144.46	267.35	475.14	328.30	217.00	0.88	0.377

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -13

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall across Sites

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	309	1423.	1691.	2104.	1776.	502.	121	1164.	1498.	1873.	1561.	530.	3.84	0.000
PROTEIN (GM)	307	51.53	64.88	80.82	67.53	21.40	120	40.08	51.42	65.46	54.57	21.00	5.70	0.000
FAT (GM)	302	53.74	66.14	85.55	70.28	23.20	120	44.89	58.20	84.87	65.76	27.60	1.57	0.117
CARBOHYDRATE (GM)	309	175.71	211.66	260.86	223.38	67.70	121	145.51	174.98	229.85	186.70	68.40	5.01	0.000
CALCIUM (MG)	307	764.	966.	1217.	1015.	384.	122	445.	618.	862.	667.	313.	9.89	0.000
IRON (MG)	304	8.32	10.74	13.57	11.27	3.93	113	7.24	9.19	11.72	9.97	3.92	3.01	0.003
MAGNESIUM (MG)	307	181.82	229.69	286.56	242.02	81.60	121	118.20	164.53	221.07	175.69	73.70	8.13	0.000
PHOSPHORUS (MG)	309	938.	1176.	1462.	1225.	397.	122	656.	857.	1128.	915.	359.	7.82	0.000
LOG VITAMIN A (IU)	309	3.45	3.66	3.93	3.70	0.36	120	3.24	3.42	3.72	3.45	0.33	6.89	0.000
VITAMIN A (IU)	309	2789.	4567.	8528.	7350.	8195.	120	1746.	2642.	5319.	3711.	3000.	6.73	0.000
THIAMIN (MG)	306	0.95	1.21	1.65	1.32	0.51	117	0.79	1.11	1.49	1.20	0.55	2.11	0.036
RIBOFAVIN (MG)	301	1.51	1.96	2.50	2.07	0.75	118	1.13	1.43	1.90	1.55	0.65	7.07	0.000
NIACIN (MG)	305	10.18	13.74	18.07	14.72	5.99	113	8.38	11.54	16.67	13.17	6.77	2.13	0.035
VITAMIN B6 (MG)	302	0.99	1.23	1.64	1.35	0.53	116	0.67	1.06	1.57	1.18	0.62	2.59	0.010
LOG VIT. B12 (MCG)	288	0.46	0.60	0.71	0.58	0.23	120	0.34	0.48	0.61	0.47	0.28	3.90	0.000
VITAMIN B12 (MCG)	288	2.90	3.98	5.10	4.40	2.98	120	2.20	3.03	4.10	3.56	2.23	3.31	0.001
VITAMIN C (MG)	302	63.06	113.29	179.73	129.06	81.50	120	41.49	94.21	172.43	114.57	92.30	1.50	0.135
CHOLESTEROL (MG)	306	193.06	290.59	456.54	342.96	194.00	121	161.78	352.88	484.35	346.28	211.00	-0.15	0.881

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions under-lying the t test.

Table 6 -14

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children across Sites

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	121	1164.	1498.	1873.	1561.	730.	309	1235.	1536.	1889.	1584.	901.	-0.41	0.679
PROTEIN (GM)	120	40.08	51.42	65.46	54.57	21.00	313	38.17	52.84	68.34	55.63	21.90	-0.47	0.642
FAT (GM)	120	44.89	58.20	84.87	65.76	27.80	310	48.64	60.58	82.08	66.96	25.90	-0.41	0.679
CARBOHYDRATE (GM)	121	145.51	174.98	229.85	186.70	68.40	306	145.89	187.36	231.07	191.91	66.60	-0.71	0.476
CALCIUM (MG)	122	445.	618.	862.	667.	313.	310	425.	637.	864.	680.	346.	-0.36	0.718
IRON (MG)	113	7.24	9.19	11.72	9.97	3.83	302	7.24	9.74	12.33	10.18	4.08	-0.47	0.639
MAGNESIUM (MG)	121	118.20	164.93	221.07	175.68	73.70	311	120.57	172.44	230.90	185.00	78.00	-1.16	0.249
PHOSPHORUS (MG)	122	656.	857.	1128.	915.	359.	310	665.	890.	1162.	947.	387.	-0.82	0.411
LOG VITAMIN A (IU)	120	3.24	3.42	3.72	3.45	0.33	300	3.24	3.42	3.61	3.44	0.32	0.34	0.735
VITAMIN A (IU)	120	1746.	2642.	5310.	3711.	3008.	300	1722.	2641.	4050.	3724.	4127.	-0.03	0.972
THIAMIN (MG)	117	0.79	1.11	1.49	1.20	0.59	302	0.78	1.10	1.48	1.18	0.53	0.29	0.774
RIBOFAVIN (MG)	118	1.13	1.43	1.90	1.55	0.65	305	1.04	1.45	1.95	1.55	0.68	0.03	0.975
NIACIN (MG)	112	8.38	11.54	16.67	13.17	6.77	308	8.62	12.52	17.30	13.67	6.55	-0.67	0.504
VITAMIN B6 (MG)	116	0.67	1.08	1.57	1.18	0.62	306	0.70	1.13	1.58	1.17	0.56	0.16	0.874
LOG VIT. B12 (MCG)	120	0.34	0.48	0.61	0.47	0.28	305	0.28	0.43	0.58	0.41	0.28	2.10	0.028
VITAMIN B12 (MCG)	120	2.20	3.03	4.10	3.56	2.23	305	1.80	2.60	3.83	3.05	1.78	2.22	0.027
VITAMIN C (MG)	120	41.40	94.21	172.43	114.57	92.30	308	35.67	86.09	151.26	108.91	91.50	0.57	0.569
CHOLESTEROL (MG)	121	161.78	352.88	484.35	346.28	211.00	308	144.46	287.35	475.14	328.30	217.00	0.79	0.432

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -15

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD .	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	109	1341.	1532.	1896.	1618.	412.	88	1274.	1507.	1895.	1549.	498.	1.04	0.301
St.Clair	71	1659.	2030.	2520.	2064.	519.	67	1475.	1709.	2040.	1762.	454.	3.65	0.000
Maricopa	58	1274.	1490.	1844.	1555.	429.	51	1097.	1389.	1917.	1475.	568.	0.82	0.414
Mingo	67	1511.	1914.	2301.	1920.	495.	103	1220.	1510.	1790.	1582.	476.	4.82	0.000
PROTEIN (GM)														
Greene/Humphreys	108	50.36	61.44	73.33	63.41	17.10	90	41.14	55.49	71.45	57.49	21.90	2.09	0.038
St.Clair	72	58.92	73.04	93.20	75.72	22.40	68	46.72	60.53	71.45	60.95	20.70	4.06	0.000
Maricopa	56	45.34	56.31	67.92	57.52	19.00	51	35.18	46.34	66.29	51.46	23.10	1.48	0.143
Mingo	71	59.78	71.70	85.80	73.39	23.60	104	36.73	50.62	67.29	52.60	21.40	5.95	0.000
FAT (GM)														
Greene/Humphreys	107	49.20	59.82	75.82	63.27	19.90	88	48.33	63.49	78.65	63.65	24.50	-0.12	0.908
St.Clair	71	60.76	76.65	100.48	81.65	27.00	68	59.45	74.28	92.74	76.25	24.10	1.24	0.216
Maricopa	58	51.44	63.28	80.51	66.10	23.00	51	40.70	61.11	83.58	64.62	30.40	0.28	0.777
Mingo	66	53.60	74.58	88.92	72.93	18.90	103	48.80	65.36	77.49	64.83	24.60	2.41	0.017
CARBOHYDRATE (GM)														
Greene/Humphreys	110	166.90	196.30	232.29	201.34	47.90	87	139.31	178.51	226.34	187.41	66.90	1.64	0.103
St.Clair	71	204.73	256.60	323.24	263.85	70.20	67	172.49	203.00	243.22	213.66	68.30	4.26	0.000
Maricopa	58	160.92	182.08	213.99	182.49	49.70	50	129.04	165.99	221.95	171.58	64.40	0.97	0.333
Mingo	70	185.96	244.91	304.11	250.84	71.90	102	146.96	186.45	229.34	191.43	63.00	5.60	0.000

Table 6 -15 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	110	788.	832.	1143.	952.	271.	89	405.	565.	827.	617.	297.	8.21	0.000
St.Clair	71	798.	1022.	1350.	1101.	417.	67	451.	637.	852.	657.	332.	6.93	0.000
Maricopa	56	623.	860.	1105.	863.	332.	50	397.	710.	931.	706.	367.	2.30	0.024
Mingo	70	891.	1144.	1420.	1151.	393.	104	438.	673.	944.	736.	377.	6.95	0.000
IRON (MG)														
Greene/Humphreys	108	8.25	9.93	12.69	10.76	3.82	82	6.95	9.77	13.17	10.18	3.97	1.02	0.310
St.Clair	70	10.08	12.69	15.45	12.88	4.03	68	9.18	10.31	14.24	11.59	4.28	1.81	0.072
Maricopa	55	7.11	9.63	11.07	9.43	3.07	49	7.19	9.65	11.34	9.51	3.60	-0.13	0.900
Mingo	71	9.11	11.42	14.43	11.90	3.87	103	6.72	8.88	11.69	9.56	4.01	3.86	0.000
MAGNESIUM (MG)														
Greene/Humphreys	110	187.10	210.14	265.04	228.58	67.00	89	136.24	174.92	236.34	190.78	81.50	3.52	0.001
St.Clair	71	214.90	283.62	358.82	289.89	87.60	68	131.05	178.36	232.05	191.71	79.60	6.92	0.000
Maricopa	58	144.98	177.39	239.41	194.98	69.50	51	105.77	154.36	218.33	167.27	79.90	1.92	0.058
Mingo	68	200.24	240.11	325.29	253.89	78.80	103	133.17	172.38	224.06	184.33	74.40	5.77	0.000
PHOSPHORUS (MG)														
Greene/Humphreys	110	998.	1125.	1341.	1181.	350.	89	669.	888.	1124.	931.	387.	4.73	0.000
St.Clair	71	1006.	1320.	1579.	1332.	404.	67	640.	899.	1225.	936.	377.	5.95	0.000
Maricopa	57	786.	997.	1273.	1034.	345.	51	629.	848.	1169.	906.	393.	1.80	0.076
Mingo	71	1048.	1319.	1659.	1340.	434.	103	687.	942.	1205.	989.	393.	5.44	0.000

Table 6 -15 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	108	3.46	3.77	4.13	3.81	0.41	89	3.32	3.50	3.68	3.54	0.36	4.99	0.000
St.Clair	72	3.53	3.78	3.96	3.77	0.34	65	3.19	3.38	3.54	3.39	0.31	6.76	0.000
Maricopa	57	3.32	3.52	3.64	3.51	0.29	49	3.20	3.41	3.59	3.42	0.29	1.60	0.112
Mingo	72	3.45	3.59	3.81	3.62	0.27	97	3.20	3.40	3.61	3.38	0.29	5.48	0.000
VITAMIN A (IU)														
Greene/Humphreys	108	2906.	5887.	13433.	10279.	11308.	89	2104.	3130.	4810.	5150.	6386.	3.98	0.000
St.Clair	72	3404.	6052.	9087.	8042.	7173.	65	1547.	2405.	3461.	3271.	3080.	5.14	0.000
Maricopa	57	2100.	3312.	4376.	3994.	2858.	49	1572.	2601.	3859.	3299.	2511.	1.33	0.186
Mingo	72	2796.	3873.	6401.	4922.	3016.	97	1584.	2535.	4079.	2933.	1852.	4.95	0.000
THIAMIN (MG)														
Greene/Humphreys	109	0.91	1.17	1.45	1.23	0.45	85	0.80	1.24	1.63	1.27	0.60	-0.45	0.651
St.Clair	71	1.09	1.46	1.98	1.55	0.60	68	1.01	1.30	1.73	1.38	0.57	1.79	0.075
Maricopa	57	0.81	1.02	1.27	1.11	0.44	48	0.63	0.82	1.32	0.97	0.42	1.72	0.089
Mingo	69	1.08	1.36	1.68	1.40	0.44	101	0.74	0.99	1.37	1.06	0.44	4.67	0.000
RIBOFAVIN (MG)														
Greene/Humphreys	103	1.50	1.91	2.38	2.02	0.69	87	1.13	1.44	1.96	1.58	0.72	4.29	0.000
St.Clair	72	1.73	2.37	3.03	2.40	0.88	65	1.04	1.49	1.93	1.53	0.60	6.86	0.000
Maricopa	55	1.17	1.69	2.11	1.67	0.63	51	0.96	1.31	1.95	1.51	0.70	1.26	0.209
Mingo	71	1.70	2.04	2.48	2.12	0.65	102	1.04	1.45	1.96	1.55	0.70	5.55	0.000

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -15 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	106	10.38	14.00	17.26	14.39	5.48	87	10.28	14.10	19.80	15.13	6.80	-0.81	0.419
St.Clair	72	12.76	16.18	21.26	17.30	6.43	68	11.13	13.99	18.73	15.58	6.59	1.56	0.121
Maricopa	57	8.71	11.12	13.67	11.87	5.04	49	7.69	10.27	13.53	11.16	5.00	0.83	0.409
Mingo	70	9.78	13.54	18.50	14.78	5.88	104	7.42	10.77	16.07	12.38	6.35	2.53	0.012
VITAMIN B6 (MG)														
Greene/Humphreys	106	1.00	1.20	1.47	1.27	0.43	84	0.84	1.25	1.76	1.29	0.57	-0.23	0.818
St.Clair	69	1.03	1.48	1.93	1.57	0.60	68	0.71	1.09	1.51	1.16	0.54	4.21	0.000
Maricopa	57	0.81	1.15	1.43	1.19	0.55	51	0.74	1.13	1.46	1.14	0.52	0.47	0.640
Mingo	70	1.03	1.26	1.71	1.38	0.49	103	0.64	0.96	1.47	1.09	0.58	3.46	0.001
LOG VIT. B12 (MCG)														
Greene/Humphreys	94	0.44	0.55	0.67	0.58	0.24	87	0.23	0.41	0.56	0.39	0.28	5.04	0.000
St.Clair	67	0.50	0.64	0.78	0.62	0.24	66	0.32	0.46	0.58	0.44	0.21	4.59	0.000
Maricopa	56	0.39	0.54	0.68	0.52	0.24	52	0.29	0.48	0.65	0.43	0.31	1.59	0.114
Mingo	71	0.51	0.62	0.71	0.60	0.19	100	0.25	0.42	0.58	0.39	0.29	5.80	0.000
VITAMIN B12 (MCG)														
Greene/Humphreys	94	2.79	3.59	4.73	4.59	3.54	87	1.70	2.55	3.62	2.99	1.97	3.79	0.000
St.Clair	67	3.19	4.33	6.05	4.73	2.27	66	2.11	2.91	3.82	3.07	1.38	5.08	0.000
Maricopa	56	2.48	3.46	4.85	3.80	1.94	52	1.95	3.01	4.51	3.33	1.97	1.23	0.222
Mingo	71	3.24	4.20	5.10	4.30	1.54	100	1.79	2.65	3.78	2.94	1.73	5.39	0.000

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -15 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	108	56.44	98.65	168.20	118.11	77.00	90	50.36	121.94	185.23	130.45	90.90	-1.02	0.309
St.Clair	71	125.12	186.31	252.78	190.62	84.50	68	27.81	123.04	208.65	144.77	121.00	2.59	0.011
Maricopa	57	42.88	69.09	116.71	89.58	60.40	50	36.08	67.89	118.25	78.89	52.20	0.98	0.328
Mingo	66	64.41	98.46	155.33	114.87	65.10	100	28.11	63.98	104.95	80.15	68.90	3.29	0.001
CHOLESTEROL (MG)														
Greene/Humphreys	108	189.04	289.32	427.12	324.85	160.00	88	145.04	230.58	417.11	295.16	190.00	1.16	0.247
St.Clair	71	261.16	412.47	644.90	428.91	212.00	66	167.88	264.89	522.24	356.50	226.00	1.93	0.056
Maricopa	58	146.53	220.08	423.64	311.33	227.00	52	119.05	310.34	507.96	332.56	223.00	-0.49	0.622
Mingo	72	187.72	273.13	373.10	310.12	168.00	102	144.64	277.69	468.30	336.46	229.00	-0.87	0.383

Table 6 -16

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	109	1341.	1532.	1856.	1618.	412.	10	1096.	1248.	1846.	1459.	520.	0.94	0.370
St.Clair	71	1659.	2030.	2520.	2084.	519.	32	1542.	1940.	2303.	1946.	499.	1.10	0.276
Maricopa	58	1274.	1490.	1844.	1555.	429.	40	1010.	1301.	1526.	1304.	412.	2.81	0.005
Mingo	67	1511.	1914.	2301.	1920.	495.	39	1141.	1514.	1824.	1534.	498.	3.86	0.000
PROTEIN (GM)														
Greene/Humphreys	108	50.36	61.44	73.33	63.41	17.10	9	32.72	47.03	50.12	46.98	20.20	2.37	0.042
St.Clair	72	58.92	73.04	93.20	75.72	22.40	32	54.04	65.30	83.70	69.70	21.60	1.30	0.199
Maricopa	56	45.34	56.31	67.02	57.52	10.00	41	39.82	44.93	54.28	46.26	16.80	3.09	0.003
Mingo	71	59.78	71.70	85.80	73.39	23.60	38	38.53	53.16	63.07	52.60	18.70	5.04	0.000
FAT (GM)														
Greene/Humphreys	107	49.20	59.82	75.82	63.27	19.80	10	36.78	48.74	93.27	60.99	35.10	0.20	0.844
St.Clair	71	60.76	76.65	100.48	81.65	27.00	31	65.25	77.27	109.23	84.51	26.50	-0.50	0.621
Maricopa	58	51.44	63.28	80.51	66.10	23.00	41	37.06	50.67	74.27	55.51	24.00	2.20	0.031
Mingo	66	59.60	74.68	88.92	72.93	18.90	38	45.04	58.39	77.50	62.77	23.00	2.31	0.024
CARBOHYDRATE (GM)														
Greene/Humphreys	110	166.90	196.30	232.29	201.34	47.80	10	144.00	158.92	212.69	175.41	45.30	1.73	0.112
St.Clair	71	204.73	256.60	323.24	263.85	70.20	32	163.59	212.36	276.57	223.67	72.30	2.64	0.011
Maricopa	58	160.92	182.08	213.99	182.49	49.70	40	109.03	161.92	200.35	161.35	60.10	1.83	0.071
Mingo	70	185.96	244.91	304.11	250.84	71.80	39	143.16	178.13	228.18	185.27	66.90	4.77	0.000

Table 6 -16 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	110	788.	932.	1143.	982.	271.	10	332.	418.	583.	461.	170.	8.23	0.000
St.Clair	71	786.	1022.	1350	1101.	417.	32	508.	665.	824.	722.	320.	5.04	0.000
Maricopa	56	623.	860.	1105.	863.	232.	41	445.	599.	777.	626.	309.	3.61	0.001
Mingo	70	891.	1144.	1420.	1151.	393.	39	463.	651.	912.	720.	321.	6.19	0.000
IRON (MG)														
Greene/Humphreys	108	8.35	9.93	12.60	10.76	3.82	9	7.84	8.91	9.15	9.17	3.19	1.41	0.189
St.Clair	70	10.08	12.60	15.45	12.88	4.03	28	9.14	12.08	15.64	12.71	4.55	0.17	0.865
Maricopa	55	7.11	9.63	11.07	9.43	3.07	40	6.43	8.51	11.10	8.81	3.47	0.90	0.371
Mingo	71	9.11	11.42	14.43	11.80	3.07	35	7.76	9.16	9.94	9.24	2.96	3.92	0.000
MAGNESIUM (MG)														
Greene/Humphreys	110	187.10	218.14	265.04	228.50	67.00	10	99.03	180.90	227.58	170.97	72.20	2.43	0.035
St Clair	71	214.90	283.62	350.82	289.80	87.60	32	162.68	202.98	270.20	217.98	77.70	4.17	0.000
Maricopa	56	144.90	177.09	239.41	194.98	60.50	40	105.15	135.21	176.94	145.14	64.40	3.64	0.000
Mingo	68	200.24	240.11	325.29	253.89	78.80	39	127.38	163.80	209.42	173.54	65.10	5.68	0.000
PHOSPHORUS (MG)														
Greene/Humphreys	110	998.	1125.	1341.	1181.	350.	10	519.	703.	841.	780.	391.	3.08	0.012
St Clair	71	1006.	1320.	1579.	1332.	404.	32	759.	1096.	1204.	1044.	343.	3.73	0.000
Maricopa	57	786.	987.	1273.	1034.	345.	41	612.	756.	912.	803.	317.	3.43	0.001
Mingo	71	1049.	1319.	1650.	1340.	434.	39	733.	911.	1148.	950.	373.	4.82	0.000

Table 6-16 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	108	3.46	3.77	4.13	3.81	0.41	10	3.29	3.33	3.73	3.45	0.40	2.69	0.021
St.Clair	72	3.53	3.78	3.96	3.77	0.34	32	3.31	3.60	3.78	3.53	0.31	3.59	0.001
Maricopa	57	3.32	3.52	3.64	3.51	0.29	39	3.11	3.27	3.44	3.32	0.33	2.85	0.006
Mingo	72	3.45	3.59	3.81	3.62	0.27	39	3.29	3.49	3.75	3.51	0.30	1.87	0.066
VITAMIN A (IU)														
Greene/Humphreys	108	2906.	5887.	13433.	10279.	11398.	10	1942.	2160.	5432.	4395.	5403.	2.90	0.010
St.Clair	72	3404.	6052.	9097.	8042.	7173.	32	2046.	4008.	6034.	4128.	2386.	4.14	0.000
Maricopa	57	2100.	3312.	4376.	3994.	2858.	39	1301.	1869.	2757.	2908.	3013.	1.77	0.080
Mingo	72	2796.	3873.	6401.	4922.	3016.	39	1965.	3073.	5578.	3996.	2588.	1.70	0.093
THIAMIN (MG)														
Greene/Humphreys	109	0.91	1.17	1.45	1.23	0.45	10	1.00	1.26	1.49	1.28	0.28	-0.46	0.650
St.Clair	71	1.09	1.46	1.98	1.55	0.60	31	1.13	1.41	1.82	1.52	0.63	0.26	0.797
Maricopa	57	0.81	1.02	1.27	1.11	0.44	39	0.61	0.85	1.16	0.93	0.40	2.04	0.045
Mingo	69	1.08	1.36	1.68	1.40	0.44	37	0.86	1.00	1.38	1.19	0.54	2.05	0.045
RIBOFLAVIN (MG)														
Greene/Humphreys	103	1.50	1.91	2.38	2.02	0.69	9	0.97	1.22	1.38	1.22	0.37	5.72	0.000
St.Clair	72	1.73	2.37	3.03	2.40	0.88	32	1.30	1.83	2.20	1.85	0.74	3.32	0.001
Maricopa	55	1.17	1.69	2.11	1.67	0.63	40	0.92	1.27	1.58	1.35	0.55	2.59	0.011
Mingo	71	1.70	2.04	2.48	2.12	0.65	37	1.19	1.55	1.88	1.58	0.63	4.21	0.000

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -16 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	106	10.38	14.00	17.26	14.39	5.48	9	10.28	10.45	15.79	12.45	3.41	1.55	0.148
St.Clair	72	12.76	16.18	21.26	17.30	6.43	30	10.65	15.99	22.55	17.93	8.37	-0.37	0.713
Maricopa	57	8.73	11.12	13.67	11.97	5.04	39	5.97	9.64	13.45	10.28	4.90	1.64	0.105
Mingo	70	9.78	13.54	18.50	14.78	5.98	35	8.26	11.80	15.60	12.51	5.63	1.91	0.060
VITAMIN B6 (MG)														
Greene/Humphreys	106	1.00	1.20	1.47	1.27	0.43	10	0.73	1.37	1.58	1.29	0.57	-0.09	0.931
St.Clair	69	1.03	1.48	1.93	1.57	0.60	29	0.75	1.16	1.87	1.34	0.72	1.54	0.131
Maricopa	57	0.81	1.15	1.43	1.18	0.55	41	0.60	0.89	1.34	1.06	0.55	1.18	0.242
Mingo	70	1.03	1.26	1.71	1.38	0.49	36	0.74	1.06	1.41	1.16	0.63	1.79	0.078
LOG VIT. B12 (MCG)														
Greene/Humphreys	94	0.44	0.55	0.67	0.58	0.24	9	-0.10	0.20	0.38	0.20	0.30	3.76	0.004
St.Clair	67	0.50	0.64	0.78	0.62	0.24	32	0.45	0.54	0.72	0.57	0.22	0.94	0.352
Maricopa	56	0.39	0.54	0.68	0.52	0.24	40	0.30	0.46	0.56	0.44	0.24	1.70	0.093
Mingo	71	0.51	0.62	0.71	0.60	0.19	39	0.41	0.48	0.60	0.49	0.30	2.03	0.047
VITAMIN B12 (MCG)														
Greene/Humphreys	94	2.79	3.59	4.73	4.59	3.54	9	0.80	1.58	2.38	1.95	1.38	4.48	0.000
St.Clair	67	3.19	4.33	6.05	4.73	2.27	32	2.84	3.51	5.32	4.28	2.35	0.90	0.373
Maricopa	56	2.48	3.46	4.85	3.80	1.94	40	1.98	2.87	3.62	3.13	1.72	1.77	0.080
Mingo	71	3.24	4.20	5.10	4.30	1.54	39	2.57	3.01	3.99	3.77	2.51	1.21	0.233

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -16 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	108	56.44	98.65	168.20	118.11	77.00	10	28.36	118.94	166.10	117.48	81.20	0.02	0.982
St.Clair	71	125.12	186.31	252.79	190.62	84.50	32	106.66	156.80	246.60	178.97	109.00	0.54	0.594
Maricopa	57	42.88	69.09	116.71	89.58	60.40	39	25.09	45.72	137.35	81.81	73.10	0.55	0.585
Mingo	66	64.41	98.46	155.33	114.87	65.10	39	41.77	86.64	114.95	93.73	71.30	1.52	0.134
CHOLESTEROL (MG)														
Greene/Humphreys	105	189.94	289.32	427.12	324.85	160.00	9	102.88	160.20	390.38	266.55	230.00	0.74	0.476
St.Clair	71	261.16	412.47	544.90	428.91	212.00	32	201.03	398.90	526.68	401.99	228.00	0.57	0.574
Maricopa	58	146.53	220.08	423.64	311.33	227.00	41	147.58	327.68	408.98	315.83	193.00	-0.11	0.916
Mingo	72	197.72	273.13	373.10	310.12	168.00	39	162.94	352.88	495.02	350.97	208.00	-1.06	0.295

Table 6-17

Total 24-Hour Nutrient Intake for Posttested Head Start and non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	10	1096.	1248.	1946.	1459.	520.	88	1274.	1507.	1895.	1549.	498.	-0.52	0.613
St.Clair	32	1542.	1940.	2383.	1946.	499.	67	1475.	1709.	2040.	1762.	454.	1.77	0.083
Maricopa	40	1010.	1301.	1526.	1304.	412.	51	1097.	1389.	1917.	1475.	568.	-1.66	0.100
Mingo	39	1141.	1514.	1824.	1534.	498.	103	1220.	1510.	1790.	1552.	476.	-0.19	0.849
PROTEIN (GM)														
Greene/Humphreys	9	32.72	47.93	50.12	46.98	20.20	90	41.14	55.49	71.45	57.49	21.90	-1.48	0.170
St.Clair	32	54.94	65.30	83.70	69.70	21.60	68	46.72	60.53	71.45	60.95	20.70	1.92	0.060
Maricopa	41	39.82	44.93	54.38	46.26	16.80	51	35.18	46.34	66.29	51.46	23.10	-1.25	0.215
Mingo	38	38.53	53.16	63.07	52.60	18.70	104	36.73	50.62	67.29	52.60	21.40	0.00	0.998
FAT (GM)														
Greene/Humphreys	10	36.78	48.74	93.27	60.99	35.10	88	48.33	63.49	78.65	63.65	24.50	-0.23	0.821
St.Clair	31	65.25	77.27	109.23	84.51	26.50	68	59.45	74.28	92.74	76.25	24.10	1.48	0.146
Maricopa	41	37.06	50.67	74.27	55.51	24.00	51	40.70	61.11	83.58	64.62	30.40	-1.60	0.112
Mingo	38	45.04	58.39	77.50	62.77	23.00	103	48.80	65.36	77.49	64.83	24.60	-0.46	0.645
CARBOHYDRATE (GM)														
Greene/Humphreys	10	144.00	158.92	212.69	175.41	45.30	87	139.31	178.51	226.34	187.41	66.90	-0.75	0.466
St.Clair	32	163.59	212.36	276.57	223.67	72.30	67	172.49	203.00	243.22	213.66	68.30	0.66	0.514
Maricopa	40	109.03	161.92	200.35	161.35	60.10	50	129.04	165.99	221.95	171.58	64.40	-0.78	0.439
Mingo	39	143.16	178.13	228.18	185.27	66.90	102	146.96	186.45	229.34	191.43	63.00	-0.50	0.621

Table 6 -17 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	10	332.	418.	583.	461.	170.	89	405.	565.	827.	617.	297.	-2.51	0.023
St.Clair	32	505.	665.	824.	722.	320.	67	451.	637.	852.	657.	332.	0.93	0.357
Maricopa	41	445.	599.	777.	626.	309.	50	397.	710.	931.	706.	367.	-1.12	0.264
Mingo	39	463.	651.	812.	720.	321.	104	438.	673.	844.	736.	377.	-0.26	0.798
IRON (MG)														
Greene/Humphreys	9	7.84	8.91	9.15	9.17	3.19	82	6.95	9.77	13.17	10.18	3.97	-0.87	0.401
St.Clair	28	9.14	12.08	15.64	12.71	4.55	68	9.18	10.31	14.24	11.59	4.28	1.13	0.265
Maricopa	40	6.43	8.51	11.10	8.81	3.47	49	7.19	9.65	11.34	9.51	3.60	-0.93	0.353
Mingo	35	7.76	8.16	8.94	8.24	2.96	103	6.72	8.88	11.69	9.56	4.01	-0.51	0.613
MAGNESIUM (MG)														
Greene/Humphreys	10	99.03	180.90	227.58	170.97	72.20	89	136.24	174.92	236.34	190.78	81.50	-0.81	0.433
St.Clair	32	162.68	202.98	270.20	217.98	77.70	68	131.05	178.36	232.05	191.71	79.60	1.56	0.123
Maricopa	40	105.15	135.21	176.94	145.14	64.40	51	105.77	154.36	218.33	167.27	79.90	-1.46	0.147
Mingo	39	123.38	163.80	209.42	173.54	65.10	103	133.17	172.38	224.06	184.33	74.40	-0.85	0.399
PHOSPHORUS (MG)														
Greene/Humphreys	10	519.	703.	941.	790.	391.	89	669.	888.	1124.	931.	387.	-1.09	0.300
St.Clair	32	759.	1096.	1204.	1044.	343.	67	640.	899.	1225.	936.	377.	1.41	0.163
Maricopa	41	612.	756.	912.	803.	317.	51	629.	848.	1169.	906.	393.	-1.39	0.169
Mingo	39	733.	911.	1148.	959.	373.	103	687.	942.	1205.	989.	393.	-0.42	0.674

Table 6 -17 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	10	3.29	3.33	3.73	3.45	0.40	89	3.32	3.50	3.68	3.54	0.36	-0.65	0.529
St.Clair	32	3.31	3.60	3.78	3.53	0.31	65	3.19	3.38	3.54	3.39	0.31	1.95	0.056
Maricopa	39	3.11	3.27	3.44	3.32	0.33	49	3.20	3.41	3.59	3.42	0.29	-1.41	0.161
Mingo	39	3.29	3.49	3.75	3.51	0.30	97	3.20	3.40	3.61	3.38	0.29	2.27	0.026
VITAMIN A (IU)														
Greene/Humphreys	10	1942.	2160.	5432.	4395.	5403.	89	2104.	3130.	4810.	5150.	6386.	-0.41	0.688
St.Clair	32	2046.	4008.	6034.	4128.	2386.	65	1547.	2405.	3461.	3271.	3080.	1.51	0.136
Maricopa	39	1301.	1869.	2757.	2908.	3013.	49	1572.	2601.	3859.	3299.	2511.	-0.65	0.518
Mingo	39	1965.	3073.	5578.	3996.	2588.	97	1584.	2535.	4079.	2933.	1852.	2.34	0.023
THIAMIN (MG)														
Greene/Humphreys	10	1.00	1.26	1.49	1.26	0.28	85	0.80	1.24	1.63	1.27	0.60	0.10	0.925
St.Clair	31	1.13	1.41	1.82	1.52	0.63	68	1.01	1.30	1.73	1.38	0.57	1.07	0.288
Maricopa	39	0.61	0.85	1.16	0.93	0.40	48	0.63	0.92	1.32	0.97	0.42	-0.38	0.705
Mingo	37	0.86	1.00	1.38	1.19	0.54	101	0.74	0.99	1.37	1.08	0.44	1.10	0.277
RIBOFLAVIN (MG)														
Greene/Humphreys	9	0.97	1.22	1.38	1.22	0.37	87	1.13	1.44	1.96	1.58	0.72	-2.51	0.024
St.Clair	32	1.30	1.83	2.20	1.85	0.74	65	1.04	1.49	1.93	1.53	0.60	2.13	0.038
Maricopa	40	0.92	1.27	1.58	1.35	0.55	51	0.96	1.31	1.95	1.51	0.70	-1.16	0.248
Mingo	37	1.19	1.55	1.88	1.58	0.63	102	1.04	1.45	1.96	1.55	0.70	0.25	0.800

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -17 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	9	10.28	10.45	15.79	12.45	3.41	87	10.28	14.10	19.80	15.13	6.80	-1.98	0.065
St.Clair	30	10.65	15.99	22.55	17.93	8.37	68	11.13	13.99	18.73	15.58	6.59	1.36	0.180
Maricopa	39	5.97	9.64	13.45	10.28	4.90	49	7.69	10.27	13.53	11.16	5.00	-0.83	0.410
Mingo	35	8.26	11.80	15.60	12.51	5.63	104	7.42	10.77	16.07	12.38	6.35	0.11	0.912
VITAMIN B6														
Greene/Humphreys	10	0.73	1.37	1.58	1.29	0.57	84	0.84	1.25	1.76	1.29	0.57	0.00	0.997
St.Clair	29	0.75	1.16	1.87	1.34	0.72	68	0.71	1.09	1.51	1.16	0.54	1.19	0.239
Maricopa	41	0.60	0.89	1.34	1.06	0.55	51	0.74	1.13	1.46	1.14	0.53	-0.73	0.466
Mingo	36	0.74	1.06	1.41	1.16	0.63	103	0.64	0.96	1.47	1.09	0.58	0.58	0.566
LOG VIT. B12 (MCG)														
Greene/Humphreys	9	-0.10	0.20	0.38	0.20	0.30	87	0.23	0.41	0.56	0.39	0.28	-1.82	0.098
St.Clair	32	0.45	0.54	0.72	0.57	0.22	66	0.32	0.46	0.58	0.44	0.21	2.80	0.007
Maricopa	40	0.30	0.46	0.56	0.44	0.24	52	0.29	0.48	0.65	0.43	0.31	0.04	0.971
Mingo	39	0.41	0.48	0.60	0.49	0.30	100	0.25	0.42	0.58	0.39	0.29	1.81	0.074
VITAMIN B12 (MCG)														
Greene/Humphreys	9	0.80	1.58	2.38	1.95	1.38	87	1.70	2.55	3.62	2.99	1.97	-2.04	0.064
St.Clair	32	2.84	3.51	5.32	4.28	2.35	66	2.11	2.91	3.82	3.07	1.38	2.68	0.011
Maricopa	40	1.98	2.87	3.62	3.13	1.72	52	1.95	3.01	4.51	3.33	1.97	-0.52	0.603
Mingo	39	2.57	3.01	3.99	3.77	2.51	100	1.79	2.65	3.78	2.94	1.73	1.89	0.064

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -17 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	10	28.36	118.94	166.10	117.48	81.20	90	50.36	121.94	185.23	130.45	90.90	-0.47	0.644
St.Clair	32	106.66	156.80	246.60	178.97	109.00	68	27.81	123.04	208.85	144.77	121.00	1.41	0.162
Maricopa	39	25.09	45.72	137.35	81.81	73.10	50	36.08	67.89	118.25	78.89	52.20	0.21	0.833
Mingo	39	41.77	86.64	114.95	93.73	71.30	100	28.11	63.98	104.95	80.15	68.90	1.02	0.312
CHOLESTEROL (MG)														
Greene/Humphreys	9	102.88	160.20	390.38	266.55	230.00	88	145.04	230.58	417.11	295.16	190.00	-0.36	0.727
St.Clair	32	201.03	398.90	526.68	401.99	228.00	66	167.88	264.89	522.24	356.50	226.00	0.93	0.357
Maricopa	41	147.58	327.68	408.98	315.83	193.00	52	119.05	310.34	507.96	332.56	223.00	-0.39	0.700
Mingo	39	162.94	352.88	495.02	350.97	208.00	102	144.64	277.69	468.30	336.46	229.00	0.36	0.720

Table 6 -18

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children across Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	310	98.34	125.12	155.81	130.47	42.00	311	89.74	117.36	144.80	120.66	42.80	2.88	0.004
PROTEIN	307	163.16	213.89	262.98	217.81	72.20	308	125.48	179.03	231.94	184.75	77.20	5.48	0.000
CALCIUM	306	94.84	120.60	151.88	126.75	45.70	310	53.11	79.60	107.99	84.89	42.90	11.72	0.000
IRON	305	71.69	97.74	130.16	103.74	41.90	306	56.82	83.99	113.43	89.67	42.20	4.14	0.000
MAGNESIUM	310	100.00	125.44	161.55	132.08	46.10	311	71.25	101.97	125.44	104.21	45.40	7.59	0.000
PHOSPHORUS	309	117.30	146.96	182.79	153.18	49.80	308	81.77	111.70	143.75	116.96	47.50	9.25	0.000
LOG VITAMIN A	309	2.07	2.27	2.55	2.33	0.36	305	1.88	2.06	2.26	2.09	0.34	8.20	0.000
VITAMIN A	309	117.14	184.60	357.96	313.39	360.00	305	76.24	115.98	181.19	178.45	223.00	5.60	0.000
THIAMIN	306	121.83	141.95	165.94	148.01	39.00	306	114.50	142.13	176.40	155.31	77.80	-1.47	0.143
RIBOFAVIN	301	167.73	205.19	239.31	210.76	59.60	303	133.10	167.45	214.63	176.66	59.80	7.02	0.000
NIACIN	307	97.74	118.64	146.57	126.21	43.40	303	95.36	120.45	153.67	128.02	46.40	-0.50	0.618
VITAMIN B6	305	79.92	108.85	143.85	116.89	49.30	305	63.33	98.56	140.00	105.35	51.40	2.83	0.005
LOG VIT. B12	300	2.10	2.23	2.34	2.25	0.30	301	1.94	2.10	2.24	2.09	0.28	6.60	0.000
VITAMIN B12	300	127.12	170.46	221.07	247.48	408.00	301	87.20	124.96	174.92	164.38	249.00	3.01	0.003
VITAMIN C	304	140.47	254.55	401.59	291.37	189.00	306	79.27	191.31	336.13	242.03	203.00	3.11	0.002

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -19

Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall across Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	310	98.34	125.12	155.81	130.47	42.00	122	76.51	107.59	134.19	109.91	41.70	4.60	0.000
PROTEIN	307	163.16	213.89	262.98	217.81	72.20	121	118.56	160.47	209.12	171.10	73.50	5.95	0.000
CALCIUM	306	84.84	120.60	151.88	126.75	45.70	122	55.60	77.28	107.77	83.43	39.20	9.83	0.000
IRON	305	71.69	97.74	130.16	103.74	41.90	115	65.28	90.11	115.65	96.80	42.30	1.50	0.134
MAGNESIUM	310	100.00	125.44	161.55	132.08	46.10	120	59.86	88.17	113.71	93.08	40.60	8.60	0.000
PHOSPHORUS	309	117.30	146.96	182.79	153.18	49.80	121	82.02	106.17	140.63	113.11	42.90	8.32	0.000
LOG VITAMIN A	309	2.07	2.27	2.55	2.33	0.36	122	1.85	2.03	2.34	2.06	0.35	6.93	0.000
VITAMIN A	309	117.14	184.60	357.96	313.39	360.00	122	70.29	107.99	218.28	158.26	138.00	6.47	0.000
THIAMIN	306	121.93	141.95	165.94	148.01	38.00	115	116.87	143.52	184.65	151.04	46.10	-0.63	0.531
RIBOFAVIN	301	167.73	205.19	239.31	210.76	59.60	116	135.00	180.86	218.74	181.08	57.80	4.66	0.000
NIACIN	307	97.74	118.64	146.57	126.21	43.40	113	96.15	125.94	163.90	128.95	45.90	-0.55	0.582
VITAMIN B6	305	79.92	108.85	143.85	116.89	49.30	119	56.11	87.77	132.88	100.11	56.70	2.84	0.005
LOG VIT. B12	300	2.10	2.23	2.34	2.25	0.30	118	1.98	2.12	2.24	2.11	0.27	4.36	0.000
VITAMIN B12	300	127.12	170.46	221.07	247.48	408.00	118	96.44	130.56	172.92	158.24	123.00	3.41	0.001
VITAMIN C	304	140.47	254.55	401.59	291.37	189.00	118	91.55	203.89	372.94	246.21	194.00	2.16	0.032

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -20

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children across Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	122	76.51	107.59	134.19	109.91	41.70	311	89.74	117.36	144.80	120.66	42.80	-2.40	0.017
PROTEIN	121	118.56	160.47	209.12	171.10	73.50	308	125.48	179.03	231.94	184.75	77.20	-1.71	0.089
CALCIUM	122	55.60	77.28	107.77	83.43	38.20	310	53.11	79.60	107.99	84.89	42.90	-0.34	0.735
IRON	115	65.28	90.11	115.65	96.80	42.30	306	56.82	83.99	113.43	89.67	42.20	1.54	0.124
MAGNESIUM	120	59.86	88.17	113.71	93.08	40.60	311	71.25	101.97	125.44	104.21	45.40	-2.47	0.014
PHOSPHORUS	121	82.02	106.17	140.63	113.11	42.90	308	81.77	111.70	143.75	116.96	47.50	-0.81	0.418
LOG VITAMIN A	122	1.85	2.03	2.34	2.06	0.35	305	1.88	2.06	2.26	2.09	0.34	-0.70	0.486
VITAMIN A	122	70.29	107.99	218.28	158.26	138.00	305	76.24	115.98	181.19	178.45	223.00	-1.13	0.258
THIAMIN	115	116.87	143.52	184.65	151.04	46.10	306	114.50	142.13	176.40	155.31	77.80	-0.69	0.491
RIBOFAVIN	116	135.00	180.86	218.74	181.08	57.80	303	133.10	167.45	214.63	176.66	59.80	0.69	0.489
NIACIN	113	96.15	125.94	163.90	128.95	45.90	303	95.36	120.45	153.67	128.02	46.40	0.18	0.855
VITAMIN B6	119	56.11	87.77	132.88	100.11	56.70	305	63.33	98.56	140.00	105.35	51.40	-0.88	0.381
LOG VIT. B12	118	1.98	2.12	2.24	2.11	0.27	301	1.94	2.10	2.24	2.08	0.28	0.80	0.427
VITAMIN B12	118	96.44	130.56	172.92	158.24	123.00	301	87.20	124.96	174.92	164.38	249.00	-0.34	0.737
VITAMIN C	118	91.55	203.89	372.94	246.21	194.00	308	79.27	191.31	336.13	242.03	203.00	0.20	0.844

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -21

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	110	89.95	117.23	148.97	121.12	36.10	90	98.83	122.97	150.32	127.42	43.60	-1.10	0.274
St.Clair	72	114.55	148.03	189.51	153.63	45.80	68	108.56	128.25	160.67	139.45	43.40	1.88	0.062
Maricopa	58	85.67	99.12	134.59	108.24	35.30	51	71.04	89.72	130.91	99.76	42.10	1.13	0.261
Mingo	70	108.94	132.34	168.91	139.77	38.30	102	87.53	112.60	137.12	112.63	35.30	4.71	0.000
PROTEIN														
Greene/Humphreys	108	168.21	199.00	258.76	211.28	64.00	90	144.32	197.48	258.95	204.96	77.10	0.62	0.536
St.Clair	70	177.64	237.14	300.28	244.06	76.30	65	145.65	199.70	235.01	205.18	77.40	2.94	0.004
Maricopa	57	132.51	170.88	222.21	181.79	67.50	49	98.05	126.14	188.73	147.67	67.20	2.60	0.011
Mingo	71	190.58	223.47	269.71	230.86	71.40	104	117.31	155.49	216.68	171.97	73.30	5.30	0.000
CALCIUM														
Greene/Humphreys	110	98.54	116.53	142.85	118.97	33.90	89	50.63	70.66	103.33	77.13	37.20	8.21	0.000
St.Clair	69	99.31	127.12	164.07	134.33	49.20	67	56.33	79.60	106.47	82.13	41.50	6.70	0.000
Maricopa	56	77.84	107.47	138.12	107.83	41.80	51	51.78	90.46	118.35	90.90	49.30	1.91	0.059
Mingo	71	111.51	143.60	179.93	146.34	52.50	103	54.73	84.09	115.60	90.43	44.80	7.34	0.000
IRON														
Greene/Humphreys	109	66.85	86.96	115.57	96.88	42.30	85	54.67	76.87	116.19	90.60	48.50	0.94	0.347
St.Clair	70	83.32	118.01	142.25	115.67	43.50	68	65.90	96.08	119.04	97.87	39.30	2.52	0.013
Maricopa	55,	71.09	96.25	110.74	94.27	30.70	51	72.15	98.67	118.23	98.99	40.30	-0.67	0.502
Mingo	71	72.56	108.86	143.04	109.86	44.30	102	51.32	72.93	97.95	78.76	37.00	4.85	0.000

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Table 6 -21 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MAGNESIUM														
Greene/Humphreys	110	99.96	124.59	144.46	126.63	37.00	90	76.16	109.20	131.06	108.17	46.80	3.04	0.003
St.Clair	72	119.88	159.87	192.62	160.67	48.50	68	77.48	103.22	128.51	109.67	45.00	6.48	0.000
Maricopa	58	72.49	89.00	119.70	97.49	34.70	50	52.34	73.85	106.03	81.63	37.70	2.26	0.026
Mingo	70	107.38	137.46	177.12	139.91	44.30	103	75.36	105.09	131.12	106.12	45.10	4.60	0.000
PHOSPHORUS														
Greene/Humphreys	109	124.78	140.09	166.42	145.82	38.70	88	80.20	109.76	138.40	112.44	45.90	5.39	0.000
St.Clair	71	125.71	165.01	197.41	166.93	51.50	67	79.98	112.35	153.18	117.02	47.10	5.94	0.000
Maricopa	57	98.24	124.66	159.18	129.30	43.20	50	78.55	103.78	142.32	111.04	47.00	2.08	0.040
Mingo	72	130.94	166.09	208.35	169.66	57.00	103	85.91	117.77	150.68	123.67	48.10	5.55	0.000
LOG VITAMIN A														
Greene/Humphreys	107	2.11	2.38	2.73	2.44	0.41	90	1.98	2.13	2.33	2.17	0.37	4.77	0.000
St.Clair	72	2.16	2.42	2.57	2.41	0.34	65	1.88	2.04	2.17	2.04	0.31	6.56	0.000
Maricopa	58	1.92	2.12	2.31	2.12	0.30	51	1.80	2.02	2.21	2.05	0.33	1.16	0.250
Mingo	72	2.07	2.19	2.45	2.24	0.26	99	1.87	2.06	2.26	2.07	0.35	3.74	0.000
VITAMIN A														
Greene/Humphreys	107	128.16	241.36	542.42	437.83	498.00	90	95.07	134.91	214.37	227.40	295.00	3.67	0.000
St.Clair	72	144.29	262.33	372.94	350.00	327.00	65	76.19	109.54	149.18	143.33	128.00	4.95	0.000
Maricopa	58	84.02	132.50	204.23	169.31	135.00	51	63.01	104.97	160.71	155.43	153.00	0.50	0.619
Mingo	72	118.35	156.94	279.08	207.91	124.00	99	73.54	115.98	182.35	168.88	220.00	1.47	0.143

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

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Table 6 -21 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN														
Greene/Humphreys	110	128.46	145.11	166.15	153.61	41.10	89	122.49	160.50	210.39	186.10	125.00	-2.35	0.021
St.Clair	70	117.65	143.05	170.48	147.18	40.30	66	117.51	142.67	179.26	148.70	42.80	-0.21	0.832
Maricopa	54	113.52	136.71	156.81	138.60	34.80	52	114.40	140.68	169.98	141.26	38.10	-0.37	0.709
Mingo	72	123.78	142.01	165.04	147.30	36.30	99	111.92	133.04	160.94	139.42	40.10	1.34	0.182
RIBOFLAVIN														
Greene/Humphreys	101	184.99	214.43	256.50	225.31	61.60	85	132.37	169.36	225.07	181.61	63.80	4.72	0.000
St.Clair	71	166.46	211.11	238.05	208.75	62.10	67	125.53	154.61	198.67	164.18	58.10	4.36	0.000
Maricopa	57	150.07	199.87	239.80	204.50	62.90	51	148.91	191.76	220.07	184.60	50.20	1.83	0.071
Mingo	72	164.73	190.73	228.73	197.30	47.20	100	138.19	169.58	211.41	176.78	61.30	2.48	0.014
NIACIN														
Greene/Humphreys	109	106.17	128.92	162.80	141.12	53.20	87	113.32	130.91	166.17	147.15	51.80	-0.80	0.425
St.Clair	71	100.77	118.64	141.73	124.35	32.80	67	108.01	122.62	151.86	130.62	39.20	-1.01	0.312
Maricopa	56	89.72	112.38	139.08	115.44	34.00	51	90.99	123.41	146.62	121.49	36.30	-0.89	0.377
Mingo	71	91.30	105.55	131.22	113.66	35.80	98	80.42	107.12	135.02	112.67	44.90	0.16	0.873
VITAMIN B6														
Greene/Humphreys	108	80.46	108.54	136.99	114.30	43.70	83	81.29	115.22	147.13	118.39	50.20	-0.59	0.556
St.Clair	71	102.80	129.33	178.50	141.00	57.50	68	67.81	96.70	143.59	106.53	50.00	3.78	0.000
Maricopa	55	62.19	87.85	102.58	87.55	36.90	51	57.23	86.54	112.38	87.81	41.10	-0.03	0.973
Mingo	71	91.96	112.85	148.82	119.43	44.60	103	54.92	89.54	143.69	102.76	55.60	2.19	0.030

Table 6 -21 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VIT. B12														
Greene/Humphreys	102	2.11	2.21	2.34	2.30	0.38	88	1.89	2.10	2.23	2.09	0.32	4.20	0.000
St.Clair	68	2.13	2.27	2.41	2.26	0.25	66	2.00	2.11	2.24	2.09	0.21	4.42	0.000
Maricopa	58	2.00	2.15	2.30	2.14	0.27	51	1.91	2.09	2.26	2.06	0.27	1.68	0.096
Mingo	72	2.17	2.26	2.34	2.24	0.20	96	1.97	2.10	2.24	2.11	0.30	3.24	0.001
VITAMIN B12														
Greene/Humphreys	102	130.15	160.78	220.84	358.72	673.00	88	76.98	124.66	169.38	178.53	276.00	2.47	0.015
St.Clair	68	133.66	187.18	254.86	211.06	116.00	66	99.05	127.88	172.15	135.73	57.90	4.77	0.000
Maricopa	58	100.60	140.94	198.52	168.06	115.00	51	80.84	122.84	180.54	135.80	77.70	1.73	0.087
Mingo	72	148.14	180.52	221.47	188.28	80.40	96	92.84	127.17	176.01	186.28	343.00	0.06	0.956
VITAMIN C														
Greene/Humphreys	110	126.02	230.01	382.53	275.52	195.00	90	111.90	270.98	411.62	289.90	202.00	-0.51	0.612
St.Clair	71	278.04	414.02	561.75	423.60	188.00	68	61.81	273.43	464.10	321.71	268.00	2.59	0.011
Maricopa	57	95.30	153.54	259.36	199.08	134.00	50	80.18	150.86	262.78	175.31	116.00	0.98	0.328
Mingo	66	143.14	218.79	345.18	255.26	145.00	100	62.47	142.17	233.21	178.12	153.00	3.29	0.001

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -22

Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	110	89.95	117.23	148.97	121.12	36.10	10	73.28	97.13	134.07	104.63	35.30	1.41	0.186
St.Clair	72	114.55	148.03	189.51	153.63	45.80	32	109.61	133.81	156.18	141.06	39.50	1.42	0.159
Maricopa	58	85.67	99.12	134.59	108.24	35.30	41	61.75	80.21	97.63	84.13	28.80	3.74	0.000
Mingo	70	108.94	132.34	168.91	139.77	38.30	39	75.64	111.53	144.71	112.81	39.40	3.46	0.001
PROTEIN														
Greene/Humphreys	109	168.21	199.00	258.76	211.28	64.00	10	116.52	154.76	207.79	173.41	91.70	1.28	0.230
St.Clair	70	177.64	237.14	300.28	244.06	76.30	32	170.00	219.40	278.90	224.72	74.20	1.21	0.231
Maricopa	57	132.51	170.88	222.21	181.79	67.50	41	100.07	124.31	161.68	128.50	44.80	4.69	0.000
Mingo	71	190.58	223.47	269.71	230.86	71.40	38	122.77	166.91	209.12	171.30	64.60	4.42	0.000
CALCIUM														
Greene/Humphreys	110	98.54	116.53	142.85	118.97	33.90	10	41.45	52.21	72.92	57.59	21.30	8.23	0.000
St.Clair	69	99.31	127.12	164.07	134.33	49.20	32	63.17	83.10	102.94	90.20	40.00	4.78	0.000
Maricopa	56	77.84	107.47	138.12	107.83	41.50	41	55.60	74.89	97.09	78.24	38.70	3.61	0.001
Mingo	71	111.51	143.60	179.93	146.34	52.50	39	57.82	81.35	113.95	89.96	40.20	6.30	0.000
IRON														
Greene/Humphreys	109	66.85	86.96	115.57	96.88	42.70	10	65.03	85.77	92.62	103.74	58.00	-0.37	0.723
St.Clair	70	83.32	118.01	142.25	115.67	43.50	29	89.74	104.31	155.62	116.55	45.80	-0.09	0.930
Maricopa	55	71.09	96.25	110.74	94.27	30.70	41	64.74	86.02	112.19	90.59	37.80	0.51	0.611
Mingo	71	72.56	108.86	143.04	109.86	44.30	35	61.35	86.42	99.36	85.73	34.20	3.09	0.003

Table 6 -22 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MAGNESIUM														
Greene/Humphreys	110	98.96	124.59	144.46	126.63	37.00	10	49.52	90.45	113.79	87.48	35.00	3.37	0.006
St.Clair	72	119.88	159.87	192.62	160.67	48.50	32	88.92	112.76	143.80	117.70	43.40	4.49	0.000
Maricopa	58	72.49	89.00	119.70	97.49	34.70	40	52.58	67.61	88.47	72.57	32.20	3.64	0.000
Mingo	70	107.38	137.46	177.12	139.91	44.30	38	66.94	92.92	110.53	95.42	36.40	5.61	0.000
PHOSPHORUS														
Greene/Humphreys	109	124.78	140.09	166.42	145.82	39.70	10	64.90	87.93	117.66	98.70	48.90	2.96	0.014
St.Clair	71	125.71	165.01	197.41	166.93	51.50	31	94.83	135.82	147.43	126.01	35.40	4.64	0.000
Maricopa	57	98.24	124.66	159.18	129.30	43.20	41	76.50	94.54	113.95	100.41	39.70	3.43	0.001
Mingo	72	130.94	166.09	208.35	169.66	57.00	39	91.59	113.85	143.45	119.91	46.70	4.95	0.000
LOG VITAMIN A														
Greene/Humphreys	107	2.11	2.38	2.73	2.44	0.41	10	1.89	1.98	2.34	2.06	0.40	2.81	0.017
St.Clair	72	2.16	2.42	2.57	2.41	0.34	32	1.92	2.20	2.39	2.15	0.30	3.76	0.000
Maricopa	58	1.92	2.12	2.31	2.12	0.30	41	1.70	1.87	2.05	1.93	0.38	2.72	0.008
Mingo	72	2.07	2.19	2.45	2.24	0.26	39	1.90	2.09	2.36	2.13	0.30	1.90	0.062
VITAMIN A														
Greene/Humphreys	107	128.16	241.36	542.42	437.83	498.00	10	77.68	98.22	217.27	178.14	215.00	3.11	0.005
St.Clair	72	144.29	262.33	372.94	350.00	327.00	32	83.68	160.33	247.89	173.69	101.00	4.15	0.000
Maricopa	58	84.02	132.50	204.23	169.31	135.00	41	50.24	74.77	111.41	130.74	161.00	1.26	0.213
Mingo	72	118.35	156.94	279.08	207.91	124.00	39	80.26	122.92	232.12	169.44	113.00	1.65	0.102

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -22 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN														
Greene/Humphreys	110	128.46	145.11	166.15	153.61	41.10	10	146.54	195.54	208.05	184.75	37.80	-2.48	0.031
St.Clair	70	117.65	143.05	170.48	147.18	40.30	31	115.73	143.05	184.65	153.62	51.50	-0.62	0.540
Maricopa	54	113.52	136.71	156.81	138.60	34.90	39	114.84	133.68	165.09	140.36	41.80	-0.21	0.831
Mingo	72	123.78	142.01	165.04	147.30	36.30	35	114.52	145.81	181.25	151.04	44.30	-0.43	0.667
RIBOFLAVIN														
Greene/Humphreys	101	184.99	214.43	256.50	225.31	61.80	9	114.47	184.74	228.83	172.72	57.90	2.60	0.027
St.Clair	71	166.46	211.11	238.05	208.75	62.10	31	132.02	163.81	188.60	165.31	46.60	3.90	0.000
Maricopa	57	150.07	199.87	239.80	204.50	62.90	39	139.11	179.05	218.74	184.11	60.10	1.60	0.113
Mingo	72	164.73	190.73	228.73	197.30	47.20	37	135.13	193.13	240.19	193.13	62.40	0.36	0.723
NIACIN														
Greene/Humphreys	109	106.17	128.92	162.80	141.12	53.20	10	125.94	140.38	176.31	151.98	41.40	-0.77	0.455
St.Clair	71	100.77	118.64	141.73	124.35	32.80	28	98.96	127.22	167.43	133.68	48.00	-0.94	0.351
Maricopa	56	89.72	112.38	139.08	115.44	34.00	39	88.25	111.02	142.73	116.86	41.40	-0.18	0.860
Mingo	71	91.30	105.55	131.22	113.66	35.80	36	89.53	129.71	170.19	131.99	48.10	-2.02	0.048
VITAMIN B6														
Greene/Humphreys	108	80.46	108.54	136.99	114.30	43.70	10	56.23	107.96	138.23	104.12	48.40	0.64	0.536
St.Clair	71	102.80	129.33	178.50	141.00	57.50	32	72.19	105.85	176.47	127.70	73.00	0.91	0.367
Maricopa	55	62.19	87.85	102.58	87.55	36.90	41	46.38	68.23	103.31	81.40	42.20	0.74	0.459
Mingo	71	91.96	112.85	148.82	119.43	44.60	36	65.74	84.88	119.04	95.79	48.40	2.45	0.017

Table 6 -22 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VIT. B12														
Greene/Humphreys	102	2.11	2.21	2.34	2.30	0.38	7	1.76	1.92	2.10	1.91	0.28	3.68	0.006
St.Clair	68	2.13	2.27	2.41	2.26	0.25	32	2.09	2.16	2.38	2.20	0.22	1.26	0.213
Maricopa	58	2.00	2.15	2.30	2.14	0.27	41	1.91	2.07	2.18	2.06	0.28	1.50	0.138
Mingo	72	2.17	2.26	2.34	2.24	0.20	38	2.04	2.13	2.24	2.14	0.28	1.92	0.060
VITAMIN B12														
Greene/Humphreys	102	130.15	160.78	220.84	358.72	673.00	7	57.90	83.90	129.52	94.65	54.10	3.79	0.000
St.Clair	68	133.66	187.18	254.86	211.06	116.00	32	123.86	145.34	242.33	180.30	95.20	1.40	0.165
Maricopa	58	100.60	140.94	198.52	168.06	115.00	41	80.68	116.56	151.56	146.86	154.00	0.75	0.458
Mingo	72	148.14	180.52	221.47	188.28	80.40	38	109.44	135.85	175.12	163.66	111.00	1.21	0.233
VITAMIN C														
Greene/Humphreys	110	126.02	230.01	382.53	275.52	195.00	10	63.03	264.30	369.11	261.06	180.00	0.24	0.814
St.Clair	71	278.04	414.02	561.75	423.60	188.00	31	237.03	323.93	545.25	378.90	221.00	0.98	0.331
Maricopa	57	95.30	153.54	259.36	199.08	134.00	39	55.76	101.60	305.23	181.81	162.00	0.55	0.585
Mingo	66	143.14	218.79	345.18	255.26	145.00	38	88.32	182.13	255.13	200.16	152.00	1.81	0.074

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -23

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	10	73.28	97.13	134.07	104.63	35.30	90	98.83	122.97	150.33	127.42	43.60	-1.89	0.084
St.Clair	32	109.61	133.81	156.18	141.06	39.50	68	108.56	128.25	160.67	139.45	43.40	0.18	0.855
Maricopa	41	61.75	80.21	97.63	84.13	28.80	51	71.04	89.72	130.91	99.76	42.10	-2.11	0.038
Mingo	38	76.64	111.53	144.71	112.81	39.40	102	87.53	112.60	137.12	112.63	35.30	0.02	0.981
PROTEIN														
Greene/Humphreys	10	116.52	154.76	207.79	173.41	91.70	90	144.32	197.48	258.95	204.96	77.10	-1.05	0.319
St.Clair	32	170.00	219.40	278.90	224.72	74.20	65	145.65	199.70	235.01	205.18	77.40	1.20	0.234
Maricopa	41	100.07	124.31	161.68	128.50	44.80	49	98.05	126.14	188.73	147.67	67.20	-1.61	0.110
Mingo	38	122.77	166.91	209.12	171.30	64.60	104	117.31	155.49	216.68	171.97	73.30	-0.05	0.959
CALCIUM														
Greene/Humphreys	10	41.45	52.21	72.92	57.59	21.30	89	50.63	70.66	103.33	77.13	37.20	-2.51	0.023
St.Clair	32	63.17	83.10	102.94	90.20	40.00	67	56.33	79.60	106.47	82.13	41.50	0.93	0.357
Maricopa	41	55.60	74.89	97.09	78.24	38.70	51	51.79	90.46	118.35	90.90	49.30	-1.38	0.171
Mingo	39	57.82	81.35	113.95	89.96	40.20	103	54.73	84.09	115.60	90.45	44.50	-0.06	0.953
IRON														
Greene/Humphreys	10	65.03	85.77	92.62	103.74	58.00	85	54.67	76.87	116.19	90.60	48.50	0.69	0.506
St.Clair	29	89.74	104.31	155.62	116.55	45.80	68	65.90	96.09	119.04	97.87	39.30	1.92	0.062
Maricopa	41	64.74	86.02	112.19	90.59	37.80	51	72.15	98.67	118.23	98.99	40.30	-1.03	0.307
Mingo	35	61.85	86.42	99.36	85.73	34.20	102	51.32	72.93	97.95	78.76	37.00	1.02	0.312

Table 6 -23 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MAGNESIUM														
Greene/Humphreys	10	49.52	90.45	113.79	87.48	35,00	90	76.16	109.20	131.06	108.17	46.80	-1.71	0.112
St.Clair	33	88.92	112.76	143.80	117.70	43.40	68	77.48	103.22	128.51	109.67	45.00	0.85	0.397
Maricopa	40	52.58	67.61	88.47	72.57	32.20	50	52.34	73.85	106.03	81.63	37.70	-1.23	0.222
Mingo	38	66.94	92.92	110.53	95.42	36.40	103	75.36	105.09	131.12	108.12	45.10	-1.72	0.090
PHOSPHORUS														
Greene/Humphreys	10	64.90	87.93	117.66	98.70	48.90	88	80.20	109.76	138.40	112.44	45.90	-0.85	0.415
St.Clair	31	94.83	135.82	147.43	126.01	35.40	67	79.98	112.35	153.18	117.02	47.10	1.05	0.298
Maricopa	41	76.50	94.54	113.95	100.41	38.70	50	78.55	103.78	142.32	111.04	47.00	-1.17	0.245
Mingo	39	91.59	113.85	143.45	119.91	46.70	103	85.91	117.77	150.68	123.67	49.10	-0.42	0.674
LOG VITAMIN A														
Greene/Humphreys	10	1.89	1.98	2.34	2.05	0.40	90	1.98	2.13	2.33	2.17	0.37	-0.83	0.423
St.Clair	32	1.92	2.20	2.39	2.15	0.30	65	1.88	2.04	2.17	2.04	0.31	1.67	0.099
Maricopa	41	1.70	1.87	2.05	1.93	0.38	51	1.80	2.02	2.21	2.05	0.33	-1.63	0.106
Mingo	39	1.90	2.09	2.36	2.13	0.30	99	1.87	2.06	2.26	2.07	0.35	1.13	0.263
VITAMIN A														
Greene/Humphreys	10	77.68	98.22	217.27	178.14	215.00	90	95.07	134.91	214.37	227.40	295.00	-0.66	0.522
St.Clair	32	83.68	160.33	247.89	173.69	101.00	65	76.19	109.54	149.18	143.33	128.00	1.27	0.208
Maricopa	41	50.24	74.77	111.41	130.74	161.00	51	63.01	104.97	160.71	155.43	153.00	-0.75	0.457
Mingo	39	80.26	122.92	232.12	169.44	113.00	99	73.54	115.98	182.35	168.88	220.00	0.02	0.984

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -23 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN														
Greene/Humphreys	10	148.54	195.54	208.05	194.75	37.80	89	122.49	160.50	210.39	186.10	125.00	-0.08	0.940
St.Clair	31	115.73	143.05	184.65	153.62	51.50	66	117.51	142.67	179.26	148.70	42.80	0.46	0.646
Maricopa	39	114.84	133.68	165.09	140.36	41.80	52	114.40	140.69	169.98	141.26	38.10	-0.11	0.916
Mingo	35	114.52	145.81	181.25	151.04	44.30	99	111.92	133.04	160.94	139.42	40.10	1.37	0.178
RIBOFLAVIN														
Greene/Humphreys	9	114.47	184.74	228.83	172.72	57.90	85	132.37	169.36	225.07	181.61	63.80	-0.43	0.674
St.Clair	31	132.02	163.81	188.60	165.31	46.60	67	125.53	154.61	198.67	164.18	58.10	0.10	0.918
Maricopa	39	139.11	179.05	218.74	184.11	60.10	51	148.91	191.76	220.07	184.60	50.20	-0.04	0.967
Mingo	37	135.13	193.13	240.19	193.13	62.40	100	138.19	169.58	211.41	176.78	61.30	1.37	0.176
NIACIN														
Greene/Humphreys	10	125.94	140.38	176.31	151.98	41.40	87	113.32	130.91	166.17	147.15	51.80	0.34	0.740
St.Clair	28	98.96	127.22	167.43	133.68	48.00	67	108.01	122.62	151.86	130.62	39.20	0.30	0.767
Maricopa	39	88.25	111.02	142.73	116.86	41.40	51	90.99	123.41	146.62	121.49	36.30	-0.55	0.581
Mingo	36	89.53	129.71	170.19	131.99	46.10	98	80.42	107.12	135.02	112.67	44.90	2.10	0.040
VITAMIN B6														
Greene/Humphreys	10	56.23	107.96	138.23	104.12	48.40	83	81.29	115.22	147.13	118.39	50.20	-0.88	0.399
St.Clair	32	72.19	105.85	176.47	127.70	73.00	68	67.81	96.70	143.59	106.53	50.00	1.48	0.145
Maricopa	41	46.38	68.23	103.31	81.40	42.20	51	57.23	86.54	112.38	87.81	41.10	-0.73	0.466
Mingo	36	65.74	84.88	119.04	95.79	48.40	103	54.92	89.54	143.69	102.76	55.60	-0.71	0.477

Table 6 -23 (continued)

Percent of Recommended Daily Intake Received for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT FROM HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VIT. B12														
Greene/Humphreys	7	1.76	1.92	2.10	1.91	0.26	88	1.89	2.10	2.23	2.09	0.32	-1.71	0.131
St.Clair	32	2.09	2.16	2.38	2.20	0.22	66	2.00	2.11	2.24	2.09	0.21	2.39	0.020
Maricopa	41	1.91	2.07	2.18	2.06	0.28	51	1.91	2.09	2.26	2.06	0.27	0.04	0.969
Mingo	38	2.04	2.13	2.24	2.14	0.28	96	1.97	2.10	2.24	2.11	0.30	0.48	0.632
VITAMIN B12														
Greene/Humphreys	7	57.90	83.90	129.52	94.65	54.10	88	76.98	124.66	169.38	178.53	276.00	-2.34	0.024
St.Clair	32	123.86	145.34	242.33	180.30	95.20	66	99.05	127.88	172.15	135.73	57.90	2.44	0.019
Maricopa	41	80.68	116.56	151.56	146.86	154.00	51	80.84	122.84	180.54	135.80	77.70	0.42	0.677
Mingo	38	109.44	135.85	175.12	163.66	111.00	96	92.84	127.17	176.01	186.28	343.00	-0.57	0.567
VITAMIN C														
Greene/Humphreys	10	63.03	264.30	369.11	261.06	180.00	90	111.90	270.98	411.62	289.90	202.00	-0.47	0.644
St.Clair	31	237.03	323.93	545.25	378.90	221.00	68	61.81	273.43	464.10	321.71	268.00	1.12	0.269
Maricopa	39	55.76	101.60	305.23	181.81	162.00	50	80.18	150.86	262.78	175.31	116.00	0.21	0.833
Mingo	38	88.32	182.13	255.13	200.16	152.00	100	62.47	142.17	233.21	178.12	153.00	0.76	0.451

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6 -24

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Calories	707	Greene & Humphreys	-87.57	31.59
		St. Clair	273.62***	33.73
		Maricopa	-220.29***	39.11
		Mingo	34.24***	30.97
		Program		
		Head Start Present vs. Non-Head Start	173.04***	39.96
		Head Start Present vs. Head Start Absent	237.00***	52.57
		Head Start Absent vs. Non-Head Start	-63.95	52.67
		Constant	1185.56	
		Statistics $F = 13.91$ $R^2 = 0.18$ $MS_e = 216176.32$		
		Site		
Protein	712	Greene & Humphreys	-0.94	1.40
		St. Clair	1.07***	1.48
		Maricopa	-7.94***	1.73
		Mingo	0.28	1.36
		Program		
		Head Start Present vs. Non-Head Start	10.54***	1.76
		Head Start Present vs. Head Start Absent	12.09***	2.34
		Head Start Absent vs. Non-Head Start	-1.54	2.34
		Constant	43.77	
		Statistics $F = 11.92$ $R^2 = 0.16$ $MS_e = 423.21$		

[a] Significance shown as:

$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Fat	705	Greene & Humphreys	-4.70*	1.63
		St. Clair	10.97***	1.74
		Maricopa	-5.34**	2.01
		Mingo	-0.88	1.60
		Program		
		Head Start Present vs. Non-Head Start	1.84	2.06
		Head Start Present vs. Head Start Absent	5.57*	2.72
		Head Start Absent vs. Non-Head Start	-3.72	2.73
		Constant	51.33	
		Statistics F = 7.99 R^2 = 0.11 MS_e = 574.22		
		Site		
Carbohydrate	709	Greene & Humphreys	-10.70**	4.21
		St. Clair	36.65***	4.30
		Maricopa	-36.95***	5.21
		Mingo	11.00**	4.12
		Program		
		Head Start Present vs. Non-Head Start	29.42***	5.33
		Head Start Present vs. Head Start Absent	40.18***	7.00
		Head Start Absent vs. Non-Head Start	-10.76	38.65
		Constant	132.11	
		Statistics F = 15.47 R^2 = 0.20 MS_e = 3857.27		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Calcium	711	Greene & Humphreys	-52.87*	23.16
		St. Clair	47.83	24.80
		Maricopa	-86.95**	28.89
		Mingo	91.99***	22.68
		Program		
		Head Start Present vs. Non-Head Start	332.16***	29.30
		Head Start Present vs. Head Start Absent	355.12***	38.57
		Head Start Absent vs. Non-Head Start	-31.96	38.65
		Constant	477.92	
		Statistics $F = 19.42$ $R^2 = 0.22$ $MS_e = 116853.62$		
		Site		
Iron	690	Greene & Humphreys	-0.23	0.26
		St. Clair	1.94***	0.28
		Maricopa	-1.67***	0.32
		Mingo	-0.35	0.25
		Program		
		Head Start Present vs. Non-Head Start	0.74*	0.32
		Head Start Present vs. Head Start Absent	1.20**	0.44
		Head Start Absent vs. Non-Head Start	-0.45	0.44
		Constant	5.18	
		Statistics $F = 9.60$ $R^2 = 0.14$ $MS_e = 14.00$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

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Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Magnesium	724	Greene & Humphreys	-11.09*	5.06
		St. Clair	35.87***	5.57
		Maricopa	-36.13***	6.44
		Mingo	12.20*	5.13
		Program		
		Head Start Present vs. Non-Head Start	50.59***	6.45
		Head Start Present vs. Head Start Absent	62.08***	8.53
		Head Start Absent vs. Non-Head Start	-11.52	8.54
		Constant	111.56	
		Statistics $F = 18.02$ $R^2 = 0.22$ $MS_e = 5958.56$		
		Site		
Phosphorus	726	Greene & Humphreys	-69.92**	25.76
		St. Clair	80.49**	26.46
		Maricopa	-117.85***	32.91
		Mingo	102.25***	25.92
		Program		
		Head Start Present vs. Non-Head Start	263.84***	32.33
		Head Start Present vs. Head Start Absent	300.66***	42.57
		Head Start Absent vs. Non-Head Start	-36.80	42.69
		Constant	687.92	
		Statistics $F = 13.53$ $R^2 = 0.17$ $MS_e = 155214.76$		

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[a] Significance shown as:

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intaks for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Vitamin A (LOG)	703	Greene & Humphreys	0.10***	0.02
		St. Clair	0.27	0.02
		Maricopa	-0.12***	0.03
		Mingo	-0.21	0.02
		Program		
		Head Start Present vs. Non-Head Start	0.25***	0.03
		Head Start Present vs. Head Start Absent	0.20***	0.04
		Head Start Absent vs. Non-Head Start	0.03	0.04
		Constant	3.31	
		Statistics $F = 15.15$ $R^2 = 0.19$ $MS_e = 0.11$		
		Site		
Thiamin	697	Greene & Humphreys	0.37**	0.03
		St. Clair	0.25***	0.04
		Maricopa	-0.26***	0.04
		Mingo	0.70	0.03
		Program		
		Head Start Present vs. Non-Head Start	0.10*	0.06
		Head Start Present vs. Head Start Absent	0.10	0.06
		Head Start Absent vs. Non-Head Start	0.00	0.08
		Constant	0.77	
		Statistics $F = 8.5$ $R^2 = 0.12$ $MS_e = 0.25$		

[a] Significance shown as:

$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] SE_b
		Site		
Riboflavin	697	Greene & Humphreys	-0.17	0.05
		St. Clair	0.21***	0.05
		Maricopa	-0.28***	0.06
		Mingo	0.24	0.05
		Program		
		Head Start Present vs. Non-Head Start	0.48***	0.05
		Head Start Present vs. Head Start Absent	0.48***	0.08
		Head Start Absent vs. Non-Head Start	0.00	0.00
		Constant	1.13	
		Statistics F = 12.43 R^2 = 0.17 MS_e = 0.49		
		Site		
Niacin	698	Greene & Humphreys	0.62**	0.42
		St. Clair	2.03***	0.44
		Maricopa	-3.16***	0.52
		Mingo	0.51	0.45
		Program		
		Head Start Present vs. Non-Head Start	0.75*	0.32
		Head Start Present vs. Head Start Absent	1.07	0.71
		Head Start Absent vs. Non-Head Start	-0.31	0.71
		Constant	9.79	
		Statistics F = 7.72 R^2 = 0.11 MS_e = 39.79		

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[a] Significance shown as:

$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

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Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Vitamin B6	487	Greene & Humphreys	0.17	0.03
		St. Clair	0.13**	0.04
		Maricopa	-0.14**	0.05
		Mingo	-0.21	0.04
		Program		
		Head Start Present vs. Non-Head Start	0.14**	0.05
		Head Start Present vs. Head Start Absent	0.13*	0.06
		Head Start Absent vs. Non-Head Start	0.00	0.06
		Constant	0.73	
		Statistics F = 3.87 R^2 = 0.06 MS_e = 0.31		
		Site		
Vitamin B12 (LOG)	490	Greene & Humphreys	-0.16	0.03
		St. Clair	0.40*	0.02
		Maricopa	-0.33	0.03
		Mingo	0.14	0.03
		Program		
		Head Start Present vs. Non-Head Start	0.16***	0.02
		Head Start Present vs. Head Start Absent	0.11***	0.03
		Head Start Absent vs. Non-Head Start	0.05	0.03
		Constant	0.33	
		Statistics F = 7.11 R^2 = 0.11 MS_e = 0.07		

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[a] Significance shown as:

$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -24 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Vitamin C	704	Greene & Humphreys	2.82	5.57
		St. Clair	51.17***	5.95
		Maricopa	-33.31***	6.93
		Mingo	-20.60***	5.52
		Program		
		Head Start Present vs. Non-Head Start	14.54*	7.05
		Head Start Present vs. Head Start Absent	4.98	9.32
		Head Start Absent vs. Non-Head Start	9.56	9.33
		Constant	102.12	
		Statistics $F = 11.40$ $R^2 = 0.15$ $MS_e = 4726.92$		
		Site		
Cholesterol	708	Greene & Humphreys	-35.37*	-0.13
		St. Clair	49.41***	14.75
		Maricopa	-5.13	17.03
		Mingo	-9.00	13.50
		Program		
		Head Start Present vs. Non-Head Start	9.26	17.45
		Head Start Present vs. Head Start Absent	Doesn't Enter Equation	
		Head Start Absent vs. Non-Head Start	7.57	23.07
		Constant	207.13	
		Statistics $F = 2.63$ $R^2 = 0.04$ $MS_e = 41401.27$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -25

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b		SE_b
Calories	196	Greene & Humphreys			
		Head Start-Present vs. Non-Head Start	72.90		66.78
		Head Start-Present vs. Head Start-Absent	198.34		144.00
		Head Start-Absent vs. Non-Head Start	-125.44		145.16
		Constant	952.34		
		Statistics $F = 2.71$ $R^2 = 0.09$ $MS_e = 183183.75$			
	167	St. Clair			
		Head Start-Present vs. Non-Head Start	327.02	***	93.74
		Head Start-Present vs. Head Start-Absent	173.76		113.04
		Head Start-Absent vs. Non-Head Start	153.40		111.80
		Constant	1598.74		
		Statistics $F = 2.33$ $R^2 = 0.11$ $MS_e = 244556.78$			
	144	Maricopa			
		Head Start-Present vs. Non-Head Start	13.66		91.32
		Head Start-Present vs. Head Start-Absent	202.06	*	96.00
		Head Start-Absent vs. Non-Head Start	-188.38		100.32
		Constant	3398.30		
		Statistics $F = 3.07$ $R^2 = 0.15$ $MS_e = 205978.94$			
	200	Mingo			
		Head Start-Present vs. Non-Head Start	293.50	***	79.58
		Head Start-Present vs. Head Start-Absent	375.04	***	99.16
		Head Start-Absent vs. Non-Head Start	-81.54		93.88
		Constant	1275.38		
		Statistics $F = 4.67$ $R^2 = 0.16$ $MS_e = 220872.70$			

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[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE$_b$
Protein	196	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	5.58	2.94
		Head Start-Present vs. Head Start-Absent	17.62 **	6.68
		Head Start-Absent vs. Non-Head Start	-12.02	6.72
		Constant	35.15	
		Statistics F = 2.87 R^2 = 0.11	MS_e = 358.62	
	169	St. Clair		
		Head Start-Present vs. Non-Head Start	13.92 ***	4.10
		Head Start-Present vs. Head Start-Absent	5.20	4.96
		Head Start-Absent vs. Non-Head Start	8.72	4.90
		Constant	60.85	
		Statistics F = 2.68 R^2 = 0.12	MS_e = 472.37	
	143	Maricopa		
		Head Start-Present vs. Non-Head Start	2.76	3.82
		Head Start-Present vs. Head Start-Absent	8.52 *	4.00
		Head Start-Absent vs. Non-Head Start	5.74	4.12
		Constant	72.29	
		Statistics F = 3.15 R^2 = 0.16	MS_e = 355.42	
		Mingo		
		Head Start-Present vs. Non-Head Start	18.18 ***	3.56
		Head Start-Present vs. Head Start-Absent	20.08 ***	4.54
		Head Start-Absent vs. Non-Head Start	-1.90	4.34
		Constant	44.32	
		Statistics F = 6.05 R^2 = 0.20	MS_e = 460.42	

[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Fat	195	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.56	3.52
		Head Start-Present vs. Head Start-Absent	5.12	
		Head Start-Absent vs. Non-Head Start	-5.68	7.64
		Constant	39.65	
		Statistics F = 1.89 R^2 = 0.08	MS_e = 511.82	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	5.04	4.86
		Head Start-Present vs. Head Start-Absent	-1.48	5.92
		Head Start-Absent vs. Non-Head Start	6.52	5.88
		Constant	64.77	
		Statistics F = 1.57 R^2 = 0.07	MS_e = 661.42	
	145	Maricopa		
		Head Start-Present vs. Non-Head Start	-2.30	5.00
		Head Start-Present vs. Head Start-Absent	8.00	5.22
		Head Start-Absent vs. Non-Head Start	-10.30	5.44
		Constant	103.00	
		Statistics F = 2.94 R^2 = 0.15	MS_e = 618.13	
	198	Mingo		
		Head Start-Present vs. Non-Head Start	5.14	3.80
		Head Start-Present vs. Head Start-Absent	9.08	4.78
		Head Start-Absent vs. Non-Head Start	-3.96	4.52
		Constant	55.87	
		Statistics F = 1.79 R^2 = 0.07	MS_e = 499.38	

[a] Significance shown as:
$^{*}p \leq .05$
$^{**}p \leq .01$
$^{***}p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE$_b$
Carbohydrate	197	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	10.82	8.60
		Head Start-Present vs. Head Start-Absent	28.32	18.44
		Head Start-Absent vs. Non-Head Start	-17.50	18.58
		Constant	119.72	
	Statistics	F = 2.04 R^2 = 0.07	MS_e = 3035.05	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	52.78 ***	13.22
		Head Start-Present vs. Head Start-Absent	49.02 **	15.90
		Head Start-Absent vs. Non-Head Start	3.76	15.72
		Constant	168.82	
	Statistics	F = 3.56 R^2 = 0.15	MS_e = 4837.80	
	143	Maricopa		
		Head Start-Present vs. Non-Head Start	6.38	11.40
		Head Start-Present vs. Head Start-Absent	16.28	11.94
		Head Start-Absent vs. Non-Head Start	9.90	12.50
		Constant	204.56	
	Statistics	F = 1.64 R^2 = 0.09	MS_e = 3180.85	
	201	Mingo		
		Head Start-Present vs. Non-Head Start	51.26 ***	10.70
		Head Start-Present vs. Head Start-Absent	68.64 ***	13.38
		Head Start-Absent vs. Non-Head Start	-17.38	12.78
		Constant	140.57	
	Statistics	F = 6.91 R^2 = 0.22	MS_e = 4086.49	

[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Calcium	198	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	320.56 ***	42.40
		Head Start-Present vs. Head Start-Absent	498.40 ***	91.56
		Head Start-Absent vs. Non-Head Start	-178.34	92.24
		Constant	340.79	
		Statistics $F = 13.84$ $R^2 = 0.37$	$MS_e = 74483.85$	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	360.02 ***	69.66
		Head Start-Present vs. Head Start-Absent	321.28 ***	83.66
		Head Start-Absent vs. Non-Head Start	38.74	82.74
		Constant	483.09	
		Statistics $F = 8.34$ $R^2 = 0.30$	$MS_e = 133927.87$	
	142	Maricopa		
		Head Start-Present vs. Non-Head Start	138.06 *	68.88
		Head Start-Present vs. Head Start-Absent	203.12 **	71.32
		Head Start-Absent vs. Non-Head Start	-65.06	74.42
		Constant	730.63	
		Statistics $F = 1.96$ $R^2 = 0.11$	$MS_e = 114232.89$	
	204	Mingo		
		Head Start-Present vs. Non-Head Start	373.88 ***	62.50
		Head Start-Present vs. Head Start-Absent	421.38	78.38
		Head Start-Absent vs. Non-Head Start	-47.52	74.90
		Constant	612.51	
		Statistics $F = 7.13$ $R^2 = 0.23$	$MS_e = 140785.99$	

[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Iron	187	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.36	0.60
		Head Start-Present vs. Head Start-Absent	1.82	1.32
		Head Start-Absent vs. Non-Head Start	-1.46	1.32
		Constant	4.49	
		Statistics F = 1.96 R^2 = 0.08 MS_e = 13.77		
	164	St. Clair		
		Head Start-Present vs. Non-Head Start	1.36	0.80
		Head Start-Present vs. Head Start-Absent	0.56	1.00
		Head Start-Absent vs. Non-Head Start	0.80	0.98
		Constant	7.10	
		Statistics F = 1.65 R^2 = 0.08 MS_e = 17.76		
	139	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.36	0.66
		Head Start-Present vs. Head Start-Absent	0.46	0.68
		Head Start-Absent vs. Non-Head Start	-0.82	0.70
		Constant	11.75	
		Statistics F = 3.28 R^2 = 0.15 MS_e = 9.93		
	200	Mingo		
		Head Start-Present vs. Non-Head Start	1.68 ***	0.60
		Head Start-Present vs. Head Start-Absent	2.60 ***	0.80
		Head Start-Absent vs. Non-Head Start	-0.90	0.76
		Constant	5.45	
		Statistics F = 4.50 R^2 = 0.16 MS_e = 13.33		

[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Magnesium	211	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	28.90 **	11.18
		Head Start-Present vs. Head Start-Absent	58.08 **	18.04
		Head Start-Absent vs. Non-Head Start	-29.54	24.32
		Constant	60.62	
		Statistics F = 6.25 R^2 = 0.20	MS_e = 6022.94	
	168	St. Clair		
		Head Start-Present vs. Non-Head Start	83.00 ***	15.32
		Head Start-Present vs. Head Start-Absent	69.06 ***	18.56
		Head Start-Absent vs. Non-Head Start	13.96	18.30
		Constant	90.70	
		Statistics F = 8.37 R^2 = 0.30	MS_e = 6600.46	
	144	Maricopa		
		Head Start-Present vs. Non-Head Start	24.92	14.42
		Head Start-Present vs. Head Start-Absent	46.56 **	15.16
		Head Start-Absent vs. Non-Head Start	-21.84	15.84
		Constant	230.33	
		Statistics F = 1.76 R^2 = 0.09	MS_e = 5132.60	
	201	Mingo		
		Head Start-Present vs. Non-Head Start	60.04 ***	12.54
		Head Start-Present vs. Head Start-Absent	75.10 ***	15.64
		Head Start-Absent vs. Non-Head Start	-15.06	14.92
		Constant	178.56	
		Statistics F = 5.31 R^2 = 0.18	MS_e = 5539.36	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b		SE_b
Phosphorous	211	Greene & Humphreys			
		Head Start-Present vs. Non-Head Start	238.32	***	55.74
		Head Start-Present vs. Head Start-Absent	395.18	**	120.46
		Head Start-Absent vs. Non-Head Start	-156.86		121.30
		Constant	510.46		
		Statistics F = 6.83 R^2 = 0.21	MS_e = 166707.43		
	167	St. Clair			
		Head Start-Present vs. Non-Head Start	332.52	***	72.84
		Head Start-Present vs. Head Start-Absent	236.54	**	87.48
		Head Start-Absent vs. Non-Head Start	95.98		86.52
		Constant	824.60		
		Statistics F = 5.79 R^2 = 0.23	MS_e = 146440.38		
	144	Maricopa			
		Head Start-Present vs. Non-Head Start	92.94		70.14
		Head Start-Present vs. Head Start-Absent	202.38	**	73.94
		Head Start-Absent vs. Non-Head Start	-109.44		76.06
		Constant	1096.69		
		Statistics F = 2.40 R^2 = 0.13	MS_e = 120701.88		
	204	Mingo			
		Head Start-Present vs. Non-Head Start	304.12	***	67.30
		Head Start-Present vs. Head Start-Absent	356.16	***	84.36
		Head Start-Absent vs. Non-Head Start	-52.02		80.72
		Constant	830.14		
		Statistics F = 5.06 R^2 = 0.17	MS_e = 163166.35		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin A (Log)	196	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.28 ***	0.06
		Head Start-Present vs. Head Start-Absent	0.04 **	0.12
		Head Start-Absent vs. Non-Head Start	-0.10	0.12
		Constant	3.35	
		Statistics $F = 5.29$ $R^2 = 0.19$ $MS_e = 0.14$		
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	0.32 ***	0.06
		Head Start-Present vs. Head Start-Absent	0.20 **	0.08
		Head Start-Absent vs. Non-Head Start	0.10	0.08
		Constant	3.10	
		Statistics $F = 7.33$ $R^2 = 0.27$ $MS_e = 0.10$		
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	0.10	0.06
		Head Start-Present vs. Head Start-Absent	0.18 **	0.06
		Head Start-Absent vs. Non-Head Start	-0.10	3.74
		Constant	3.74	
		Statistics $F = 3.56$ $R^2 = 0.16$ $MS_e = 0.09$		
	200	Mingo		
		Head Start-Present vs. Non-Head Start	0.22 ***	0.04
		Head Start-Present vs. Head Start-Absent	0.12 *	0.06
		Head Start-Absent vs. Non-Head Start	0.10	0.06
		Constant	3.40	
		Statistics $F = 4.19$ $R^2 = 0.15$ $MS_e = 0.08$		

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[a] Significance shown as:
$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Thiamin	193	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.06	0.08
		Head Start-Present vs. Head Start-Absent	0.28 **	0.10
		Head Start-Absent vs. Non-Head Start	-0.04	0.18
		Constant	0.65	
		Statistics F = 1.21 R^2 = 0.05 MS_e = 0.26		
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	0.10	0.12
		Head Start-Present vs. Head Start-Absent	0.04	0.14
		Head Start-Absent vs. Non-Head Start	0.06	0.14
		Constant	0.82	
		Statistics F = 1.51 R^2 = 0.07 MS_e = 0.35		
	139	Maricopa		
		Head Start-Present vs. Non-Head Start	0.10	0.08
		Head Start-Present vs. Head Start-Absent	0.16	0.08
		Head Start-Absent vs. Non-Head Start	-0.06	0.10
		Constant	2.14	
		Statistics F = 2.75 R^2 = 0.15 MS_e = 0.16		
	198	Mingo		
		Head Start-Present vs. Non-Head Start	0.28 ***	0.08
		Head Start-Present vs. Head Start-Absent	0.22 *	0.10
		Head Start-Absent vs. Non-Head Start	0.06	0.10
		Constant	0.83	
		Statistics F = 2.96 R^2 = 0.11 MS_e = 0.22		

[a] Significance shown as:
*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6-25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] SE_b
Riboflavin	188	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.46 ***	0.12
		Head Start-Present vs. Head Start-Absent	0.82 ***	0.24
		Head Start-Absent vs. Non-Head Start	-0.38	0.24
		Constant	1.35	
	Statistics	F = 4.29 R^2 = 0.14	MS_e = 0.47	
	166	St. Clair		
		Head Start-Present vs. Non-Head Start	0.72 ***	0.14
		Head Start-Present vs. Head Start-Absent	0.52 **	0.18
		Head Start-Absent vs. Non-Head Start	0.20	0.16
		Constant	0.66	
	Statistics	F = 7.85 R^2 = 0.29	MS_e = 0.55	
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	1.16	0.12
		Head Start-Present vs. Head Start-Absent	0.26	0.14
		Head Start-Absent vs. Non-Head Start	-0.14	0.14
		Constant	2.84	
	Statistics	F = 1.36 R^2 = 0.08	MS_e = 0.40	
	202	Mingo		
		Head Start-Present vs. Non-Head Start	0.50 ***	0.12
		Head Start-Present vs. Head Start-Absent	0.54 ***	0.14
		Head Start-Absent vs. Non-Head Start	-0.02	0.14
		Constant	1.14	
	Statistics	F = 4.44 R^2 = 0.16	MS_e = 0.46	

[a] Significance shown as:

- *$p \leq .05$
- **$p \leq .01$
- ***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Niacin	191	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-1.06	0.96
		Head Start-Present vs. Head Start-Absent	1.98	2.12
		Head Start-Absent vs. Non-Head Start	-3.04	2.14
		Constant	9.31	
		Statistics F = 1.47 R^2 = 0.05 MS_e = 35.79		
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	1.24	1.30
		Head Start-Present vs. Head Start-Absent	-0.34	1.60
		Head Start-Absent vs. Non-Head Start	1.58	1.58
		Constant	9.27	
		Statistics F = 1.49 R^2 = 0.07 MS_e = 46.96		
	140	Maricopa		
		Head Start-Present vs. Non-Head Start	0.68	1.00
		Head Start-Present vs. Head Start-Absent	1.48	1.04
		Head Start-Absent vs. Non-Head Start	-0.80	1.10
		Constant	13.51	
		Statistics F = 1.08 R^2 = 0.05 MS_e = 23.63		
	200	Mingo		
		Head Start-Present vs. Non-Head Start	2.58 *	1.02
		Head Start-Present vs. Head Start-Absent	2.68 *	1.34
		Head Start-Absent vs. Non-Head Start	1.20	1.26
		Constant	9.87	
		Statistics F = 1.72 R^2 = 0.07 MS_e = 37.30		

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_6	190	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.04	0.08
		Head Start-Present vs. Head Start-Absent	0.28 **	0.10
		Head Start-Absent vs. Non-Head Start	-0.04	0.18
		Constant	0.65	
		Statistics F = 1.13 R^2 = 0.05	MS_e = 0.25	
	163	St. Clair		
		Head Start-Present vs. Non-Head Start	0.36 **	3.10
		Head Start-Present vs. Head Start-Absent	0.22	0.14
		Head Start-Absent vs. Non-Head Start	0.14	0.14
		Constant	0.53	
		Statistics F = 3.10 R^2 = 0.14	MS_e = 0.36	
	144	Maricopa		
		Head Start-Present vs. Non-Head Start	0.02	0.10
		Head Start-Present vs. Head Start-Absent	0.12	0.12
		Head Start-Absent vs. Non-Head Start	-0.12	0.12
		Constant	2.63	
		Statistics F = 1.34 R^2 = 0.07	MS_e = 0.29	
	200	Mingo		
		Head Start-Present vs. Non-Head Start	0.24 *	0.10
		Head Start-Present vs. Head Start-Absent	0.24 *	0.12
		Head Start-Absent vs. Non-Head Start	0.22	0.12
		Constant	0.74	
		Statistics F = 1.97 R^2 = 0.08	MS_e = 0.33	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b		Effects[c] SE_b
Vitamin B_{12} (Log)	181	Greene & Humphreys			
		Head Start-Present vs. Non-Head Start	0.18	***	0.04
		Head Start-Present vs. Head Start-Absent	0.40	***	0.10
		Head Start-Absent vs. Non-Head Start	-0.22		0.10
		Constant	0.22		
		Statistics $F = 6.25$ $R^2 = 0.20$ $MS_e = 0.07$			
	162	St. Clair			
		Head Start-Present vs. Non-Head Start	0.14	**	0.04
		Head Start-Present vs. Head Start-Absent	0.02		0.06
		Head Start-Absent vs. Non-Head Start	0.12	*	0.06
		Constant	0.34		
		Statistics $F = 3.88$ $R^2 = 0.17$ $MS_e = 0.05$			
	143	Maricopa			
		Head Start-Present vs. Non-Head Start	0.06		0.06
		Head Start-Present vs. Head Start-Absent	0.06		0.06
		Head Start-Absent vs. Non-Head Start	-0.24	*	0.10
		Constant	0.75		
		Statistics $F = 1.57$ $R^2 = 0.09$ $MS_e = 0.07$			
	203	Mingo			
		Head Start-Present vs. Non-Head Start	0.20	***	0.04
		Head Start-Present vs. Head Start-Absent	0.10		0.06
		Head Start-Absent vs. Non-Head Start	0.08		0.06
		Constant	0.41		
		Statistics $F = 3.27$ $R^2 = 0.12$ $MS_e = 0.07$			

[a] Significance shown as:

*$p \leq .05$

**$p \leq .01$

***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin C	198	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-14.84	12.90
		Head Start-Present vs. Head Start-Absent	5.92	27.86
		Head Start-Absent vs. Non-Head Start	-20.76	28.00
		Constant	51.43	
		Statistics $F = 1.06$ $R^2 = 0.04$ $MS_e = 6878.37$		
	168	St. Clair		
		Head Start-Present vs. Non-Head Start	44.50 *	19.86
		Head Start-Present vs. Head Start-Absent	7.74	24.08
		Head Start-Absent vs. Non-Head Start	36.76	23.72
		Constant	170.41	
		Statistics $F = 1.55$ $R^2 = 0.07$ $MS_e = 11094.88$		
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	9.80	12.40
		Head Start-Present vs. Head Start-Absent	6.28	13.12
		Head Start-Absent vs. Non-Head Start	3.52	13.58
		Constant	146.00	
		Statistics $F = 1.27$ $R^2 = 0.06$ $MS_e = 3772.05$		
	197	Mingo		
		Head Start-Present vs. Non-Head Start	34.42 **	11.62
		Head Start-Present vs. Head Start-Absent	17.94	14.56
		Head Start-Absent vs. Non-Head Start	16.52	13.86
		Constant	101.76	
		Statistics $F = 1.61$ $R^2 = 0.06$ $MS_e = 4754.85$		

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[a] Significance shown as:

*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistances programs.

[c] Centered without weights.

Table 6 -25 (continued)

Regression Analyses[a] of 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Cholesterol	191	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	43.30	27.18
		Head Start-Present vs. Head Start-Absent	67.34	61.34
		Head Start-Absent vs. Non-Head Start	-24.04	61.72
		Constant	328.13	
	Statistics	F = 1.05 R^2 = 0.04	MS_e = 30156.21	
	166	St. Clair		
		Head Start-Present vs. Non-Head Start	75.48	42.46
		Head Start-Present vs. Head Start-Absent	25.62	51.32
		Head Start-Absent vs. Non-Head Start	49.86	50.60
		Constant	432.45	
	Statistics	F = 0.60 R^2 = 0.03	MS_e = 50346.27	
	146	Maricopa		
		Head Start-Present vs. Non-Head Start	-33.98	42.96
		Head Start-Present vs. Head Start-Absent	105.10	71.92
		Head Start-Absent vs. Non-Head Start	-31.40	46.82
		Constant	-122.94	
	Statistics	F = 1.34 R^2 = 0.07	MS_e = 46171.16	
	205	Mingo		
		Head Start-Present vs. Non-Head Start	-40.74	34.02
		Head Start-Present vs. Head Start-Absent	-47.22	42.58
		Head Start-Absent vs. Non-Head Start	6.46	40.92
		Constant	292.41	
	Statistics	F = 0.78 R^2 = 0.03	MS_e = 41775.47	

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[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6 -26

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children across Sites

		ABSENT	NHS
KILOCALORIES	N	122	314
0-33 Pct RDA	n	0	1
	%	0.0	0.3
34-66 Pct RDA	n	16	24
	%	13.1	7.6
67-100 Pct RDA	n	40	79
	%	32.8	25.2
100 Pct RDA	n	66	210
	%	54.1	66.9
		CHI SQ = 7.386 DF = 3 P = 0.060	
PROTEIN	N	122	314
0-33 Pct RDA	n	1	1
	%	0.8	0.3
34-66 Pct RDA	n	3	9
	%	2.5	2.9
67-100 Pct RDA	n	11	26
	%	9.0	8.3
100 Pct RDA	n	107	278
	%	87.7	88.5
		CHI SQ = 0.637 DF = 3 P = 0.887	

		ABSENT	NHS
CALCIUM	N	122	314
0-33 Pct RDA	n	8	28
	%	6.6	8.9
34-66 Pct RDA	n	39	93
	%	32.0	29.6
67-100 Pct RDA	n	41	89
	%	33.6	28.3
100 Pct RDA	n	34	104
	%	27.9	33.1
		CHI SQ = 2.339 DF = 3 P = 0.505	
IRON	N	122	314
0-33 Pct RDA	n	1	14
	%	0.8	4.5
34-66 Pct RDA	n	30	89
	%	24.6	28.3
67-100 Pct RDA	n	40	98
	%	32.8	31.2
100 Pct RDA	n	51	113
	%	41.8	36.0
		CHI SQ = 4.695 DF = 3 P = 0.196	

		ABSENT	NHS
MAGNESIUM	N	122	314
0-33 Pct RDA	n	3	8
	%	2.5	2.5
34-66 Pct RDA	n	33	57
	%	27.0	18.2
67-100 Pct RDA	n	37	86
	%	30.3	27.4
100 Pct RDA	n	49	163
	%	40.2	51.9
		CHI SQ = 6.134 DF = 3 P = 0.105	
PHOSPHORUS	N	122	314
0-33 Pct RDA	n	1	6
	%	0.8	1.9
34-66 Pct RDA	n	15	32
	%	12.3	10.2
67-100 Pct RDA	n	37	90
	%	30.3	28.7
100 Pct RDA	n	69	186
	%	56.6	59.2
		CHI SQ = 1.204 DF = 3 P = 0.752	

		ABSENT	NHS
VITAMIN A	N	122	314
0-33 Pct RDA	n	9	15
	%	7.4	4.8
34-66 Pct RDA	n	15	47
	%	12.3	15.0
67-100 Pct RDA	n	29	60
	%	23.8	19.1
100 Pct RDA	n	69	192
	%	56.6	61.1
		CHI SQ = 2.765 DF = 3 P = 0.429	
THIAMIN	N	122	314
34-66 Pct RDA	n	1	4
	%	0.8	1.3
67-100 Pct RDA	n	12	38
	%	9.8	12.1
100 Pct RDA	n	109	272
	%	89.3	86.6
		CHI SQ = 0.626 DF = 2 P = 0.731	

Table 6 -26 (continued)

		ABSENT	HHS
RIBOFLAVIN	N	122	314
34-66 Pct RDA	n	0	1
	%	0.0	0.3
67-100 Pct RDA	n	7	29
	%	5.7	9.2
100 Pct RDA	n	115	284
	%	94.3	90.4
		CHI SQ = 1.830 DF = 2 P = 0.400	
NIACIN	N	122	314
34-66 Pct RDA	n	6	17
	%	4.9	5.4
67-100 Pct RDA	n	31	67
	%	25.4	21.3
100 Pct RDA	n	85	230
	%	69.7	73.2
		CHI SQ = 0.845 DF = 2 P = 0.656	

		ABSENT	HHS
VITAMIN B6	N	122	314
0-33 Pct RDA	n	4	14
	%	3.3	4.5
34-66 Pct RDA	n	36	65
	%	29.5	20.7
67-100 Pct RDA	n	32	78
	%	26.2	24.8
100 Pct RDA	n	50	157
	%	41.0	50.0
		CHI SQ = 4.810 DF = 3 P = 0.186	
VITAMIN B12	N	122	314
0-33 Pct RDA	n	6	15
	%	4.9	4.8
34-66 Pct RDA	n	11	39
	%	9.0	12.4
67-100 Pct RDA	n	18	53
	%	14.8	16.9
100 Pct RDA	n	87	207
	%	71.3	65.9
		CHI SQ = 1.510 DF = 3 P = 0.679	

		ABSENT	HHS
VITAMIN C	N	122	314
0-33 Pct RDA	n	12	34
	%	9.8	10.8
34-66 Pct RDA	n	10	34
	%	8.2	10.8
67-100 Pct RDA	n	11	22
	%	9.0	7.0
100 Pct RDA	n	89	224
	%	73.0	71.3
		CHI SQ = 1.186 DF = 3 P = 0.756	

Table 6 -27

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
KILOCALORIES		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	0	0	0	0	1	0	0
	%	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
34-66 Pct RDA	n	1	7	0	0	12	10	3	7
	%	10.0	7.8	0.0	0.0	29.3	19.2	7.7	6.7
67-100 Pct RDA	n	4	16	4	10	19	19	13	34
	%	40.0	17.8	12.5	14.7	46.3	36.5	33.3	32.7
100 Pct RDA	n	5	67	28	58	10	22	23	63
	%	50.0	74.4	87.5	85.3	24.4	42.3	59.0	60.6
		CHI SQ = 3.025 DF = 2 P = 0.220		CHI SQ = 0.088 DF = 1 P = 0.767		CHI SQ = 4.443 DF = 3 P = 0.217		CHI SQ = 0.053 DF = 2 P = 0.974	
PROTEIN		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	1	0	0	1	0	0	0
	%	0.0	1.1	0.0	0.0	2.4	0.0	0.0	0.0
34-66 Pct RDA	n	0	0	0	0	2	5	1	4
	%	0.0	0.0	0.0	0.0	4.9	9.6	2.6	3.8
67-100 Pct RDA	n	2	4	0	3	7	8	2	11
	%	20.0	4.4	0.0	4.4	17.1	15.4	5.1	10.6
100 Pct RDA	n	8	85	32	65	31	39	36	89
	%	80.0	94.4	100.0	95.6	75.6	75.0	92.3	85.6
		CHI SQ = 3.943 DF = 2 P = 0.139		CHI SQ = 1.455 DF = 1 P = 0.228		CHI SQ = 1.993 DF = 3 P = 0.574		CHI SQ = 1.207 DF = 2 P = 0.547	

Table 6 -27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
CALCIUM		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	1	7	1	10	4	5	2	6
	%	10.0	7.8	3.1	14.7	9.8	9.6	5.1	5.8
34-66 Pct RDA	n	6	36	8	15	14	14	11	28
	%	60.0	40.0	25.0	22.1	34.1	26.9	28.2	26.9
67-100 Pct RDA	n	3	23	14	20	13	11	11	35
	%	30.0	25.6	43.8	29.4	31.7	21.2	28.2	33.7
100 Pct RDA	n	0	24	9	23	10	22	15	35
	%	0.0	26.7	28.1	33.8	24.4	42.3	38.5	33.7
		CHI SQ = 3.648 DF = 3 P = 0.302		CHI SQ = 4.271 DF = 3 P = 0.234		CHI SQ = 3.526 DF = 3 P = 0.317		CHI SQ = 0.487 DF = 3 P = 0.922	
IRON		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	3	0	3	1	4	0	4
	%	0.0	3.3	0.0	4.4	2.4	7.7	0.0	3.8
34-66 Pct RDA	n	3	28	4	15	12	5	11	41
	%	30.0	31.1	12.5	22.1	29.3	9.6	28.2	39.4
67-100 Pct RDA	n	5	26	6	22	13	17	16	33
	%	50.0	28.9	18.8	32.4	31.7	32.7	41.0	31.7
100 Pct RDA	n	2	33	22	28	15	26	12	26
	%	20.0	36.7	68.8	41.2	36.6	50.0	30.8	25.0
		CHI SQ = 2.345 DF = 3 P = 0.504		CHI SQ = 7.205 DF = 3 P = 0.066		CHI SQ = 6.963 DF = 3 P = 0.073		CHI SQ = 3.552 DF = 3 P = 0.314	

Table 6-27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
MAGNESIUM		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	2	0	1	3	4	0	1
	%	0.0	2.2	0.0	1.5	7.3	7.7	0.0	1.0
34-66 Pct RDA	n	3	13	4	10	16	17	10	17
	%	30.0	14.4	12.5	14.7	39.0	32.7	25.6	16.3
67-100 Pct RDA	n	4	24	7	21	13	16	13	25
	%	40.0	26.7	21.9	30.9	31.7	30.8	33.3	24.0
100 Pct RDA	n	3	51	21	36	9	15	16	61
	%	30.0	56.7	65.6	52.9	22.0	28.8	41.0	58.7
		CHI SQ = 3.340 DF = 3 P = 0.342		CHI SQ = 1.791 DF = 3 P = 0.617		CHI SQ = 0.692 DF = 3 P = 0.875		CHI SQ = 4.232 DF = 3 P = 0.238	
PHOSPHORUS		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	3	0	0	1	2	0	1
	%	0.0	3.3	0.0	0.0	2.4	3.8	0.0	1.0
34-66 Pct RDA	n	3	7	2	11	6	7	4	7
	%	30.0	7.8	6.3	16.2	14.6	13.5	10.3	6.7
67-100 Pct RDA	n	3	27	9	17	15	15	10	31
	%	30.0	30.0	28.1	25.0	36.6	28.8	25.6	29.8
100 Pct RDA	n	4	53	21	40	19	28	25	65
	%	40.0	58.9	65.6	58.8	46.3	53.8	64.1	62.5
		CHI SQ = 5.341 DF = 3 P = 0.148		CHI SQ = 1.896 DF = 2 P = 0.388		CHI SQ = 0.844 DF = 3 P = 0.839		CHI SQ = 1.017 DF = 3 P = 0.797	

Table 6 -27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
VITAMIN A		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	1	3	2	3	5	2	1	7
	%	10.0	3.3	6.3	4.4	12.2	3.8	2.6	6.7
34-66 Pct RDA	n	1	6	1	12	9	13	4	16
	%	10.0	6.7	3.1	17.6	22.0	25.0	10.3	15.4
67-100 Pct RDA	n	3	18	6	14	13	9	7	19
	%	30.0	20.0	18.8	20.6	31.7	17.3	17.9	18.3
100 Pct RDA	n	5	63	23	39	14	28	27	62
	%	50.0	70.0	71.9	57.4	34.1	53.8	69.2	59.6
		CHI SQ = 2.101 DF = 3 P = 0.552		CHI SQ = 4.464 DF = 3 P = 0.216		CHI SQ = 6.193 DF = 3 P = 0.103		CHI SQ = 1.836 DF = 3 P = 0.607	
THIAMIN		10	90	32	68	41	52	39	104
34-66 Pct RDA	n	0	2	0	1	1	0	0	1
	%	0.0	2.2	0.0	1.5	2.4	0.0	0.0	1.0
67-100 Pct RDA	n	0	8	3	8	6	9	3	13
	%	0.0	8.9	9.4	11.8	14.6	17.3	7.7	12.5
100 Pct RDA	n	10	80	29	59	34	43	36	90
	%	100.0	88.9	90.6	86.8	82.9	82.7	92.3	86.5
		CHI SQ = 1.235 DF = 2 P = 0.539		CHI SQ = 0.620 DF = 2 P = 0.733		CHI SQ = 1.370 DF = 2 P = 0.504		CHI SQ = 1.068 DF = 2 P = 0.586	

Table 6 -27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
RIBOFLAVIN		10	90	32	68	41	52	39	104
34-66 Pct RDA	n	0	0	0	0	0	0	0	1
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
67-100 Pct RDA	n	0	5	3	9	2	4	2	11
	%	0.0	5.6	9.4	13.2	4.9	7.7	5.1	10.6
100 Pct RDA	n	10	85	29	59	39	48	37	92
	%	100.0	94.4	90.6	86.8	95.1	92.3	94.9	88.5
		CHI SQ = 0.585 DF = 1 P = 0.444		CHI SQ = 0.307 DF = 1 P = 0.580		CHI SQ = 0.301 DF = 1 P = 0.583		CHI SQ = 1.430 DF = 2 P = 0.489	
NIACIN		10	90	32	68	41	52	39	104
34-66 Pct RDA	n	0	1	1	3	3	2	2	11
	%	0.0	1.1	3.1	4.4	7.3	3.8	5.1	10.6
67-100 Pct RDA	n	1	9	7	10	13	15	10	33
	%	10.0	10.0	21.9	14.7	31.7	28.8	25.6	31.7
100 Pct RDA	n	9	80	24	55	25	35	27	60
	%	90.0	88.9	75.0	80.9	61.0	67.3	69.2	57.7
		CHI SQ = 0.112 DF = 2 P = 0.945		CHI SQ = 0.843 DF = 2 P = 0.656		CHI SQ = 0.718 DF = 2 P = 0.698		CHI SQ = 1.897 DF = 2 P = 0.387	

Table 6 -27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
VITAMIN B6		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	0	2	0	1	2	4	2	7
	%	0.0	2.2	0.0	1.5	4.9	7.7	5.1	6.7
34-66 Pct RDA	n	4	15	7	13	18	14	7	23
	%	40.0	16.7	21.9	19.1	43.9	26.9	17.9	22.1
67-100 Pct RDA	n	1	15	7	24	10	12	14	27
	%	10.0	16.7	21.9	35.3	24.4	23.1	35.9	26.0
100 Pct RDA	n	5	58	18	30	11	22	16	47
	%	50.0	64.4	56.3	44.1	26.8	42.3	41.0	45.2
		CHI SQ = 3.349 DF = 3 P = 0.341		CHI SQ = 2.485 DF = 3 P = 0.478		CHI SQ = 3.767 DF = 3 P = 0.288		CHI SQ = 1.439 DF = 3 P = 0.696	
VITAMIN B12		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	3	3	0	2	1	3	2	7
	%	30.0	3.3	0.0	2.9	2.4	5.8	5.1	6.7
34-66 Pct RDA	n	2	16	2	5	6	7	1	11
	%	20.0	17.8	6.3	7.4	14.6	13.5	2.6	10.6
67-100 Pct RDA	n	2	15	3	10	7	11	6	17
	%	20.0	16.7	9.4	14.7	17.1	21.2	15.4	16.3
100 Pct RDA	n	3	56	27	51	27	31	30	69
	%	30.0	62.2	84.4	75.0	65.9	59.6	76.9	66.3
		CHI SQ = 12.334 DF = 3 P = 0.006		CHI SQ = 1.700 DF = 3 P = 0.637		CHI SQ = 0.894 DF = 3 P = 0.812		CHI SQ = 2.761 DF = 3 P = 0.430	

Table 6 -27 (continued)

Distribution of Percent of Recommended Daily Intake Received in Reported 24-Hour Intake for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent from Head Start on Day of Recall and Non-Head Start Children within Site

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		ABSENT	NHS	ABSENT	NHS	ABSENT	NHS	ABSENT	NHS
VITAMIN C		10	90	32	68	41	52	39	104
0-33 Pct RDA	n	2	6	1	8	6	5	3	15
	%	20.0	6.7	3.1	11.8	14.6	9.6	7.7	14.4
34-66 Pct RDA	n	1	7	0	10	5	5	4	12
	%	10.0	7.8	0.0	14.7	12.2	9.6	10.3	11.5
67-100 Pct RDA	n	0	6	0	0	7	7	4	9
	%	0.0	6.7	0.0	0.0	17.1	13.5	10.3	8.7
100 Pct RDA	n	7	71	31	50	23	35	28	68
	%	70.0	78.9	96.9	73.5	56.1	67.3	71.8	65.4
		CHI SQ = 2.813 DF = 3 P = 0.421		CHI SQ = 7.975 DF = 2 P = 0.019		CHI SQ = 1.291 DF = 3 P = 0.731		CHI SQ = 1.316 DF = 3 P = 0.725	

Table 6 -28

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttreated Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start children across Sites

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)	306	33.23	37.77	42.94	38.10	7.17	300	28.41	34.48	41.40	34.93	8.95	4.85	0.000
FAT (GM)	302	35.51	38.59	43.44	39.61	5.86	310	36.08	41.79	47.67	41.80	8.43	-3.73	0.000
CARBOHYDRATE (GM)	308	114.04	124.86	135.97	125.17	16.70	306	105.36	122.62	137.79	122.75	23.90	1.45	0.147
CALCIUM (MG)	307	451.54	585.35	689.90	576.52	162.00	312	301.95	422.10	558.77	436.79	196.00	8.68	0.000
IRON (MG)	308	5.36	6.03	7.14	6.41	1.70	308	5.31	6.11	7.25	6.86	4.06	-1.80	0.073
MAGNESIUM (MG)	307	116.74	134.94	154.60	136.02	28.20	310	89.89	112.57	134.05	116.40	38.90	7.40	0.000
PHOSPHORUS (MG)	308	604.89	687.38	767.78	686.48	133.00	310	476.30	576.06	712.22	600.69	180.00	6.79	0.000
VITAMIN A (IU)	308	1642.	2564.	4542.	4222.	5498.	305	1151.	1735.	2677.	2538.	2820	5.06	0.000
THIAMIN (MG)	304	0.61	0.71	0.82	0.74	0.18	300	0.57	0.70	0.87	0.75	0.25	-0.59	0.553
RIBOFAVIN (MG)	304	0.92	1.13	1.33	1.20	0.46	306	0.73	0.92	1.20	1.02	0.52	4.48	0.000
NIACIN (MG)	304	6.43	7.80	9.62	8.29	2.84	301	6.26	7.92	10.10	8.70	4.72	-1.29	0.199
VITAMIN B6 (MG)	305	0.61	0.72	0.88	0.78	0.28	311	0.52	0.68	0.93	0.79	0.90	-0.53	0.599
VITAMIN B12 (MCG)	296	1.81	2.27	2.74	3.40	6.06	289	1.31	1.83	2.90	2.52	4.34	2.02	0.044
VITAMIN C (MG)	310	39.89	67.43	107.74	76.84	49.60	314	26.17	53.78	104.88	71.69	58.50	1.21	0.227
CHOLESTEROL (MG)	306	116.56	160.70	238.40	191.98	97.80	308	106.18	154.61	280.11	208.13	139.00	-1.67	0.096

Table 6 -29

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent on Day of Recall across Sites

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)	306	33.23	37.77	42.94	38.10	7.17	121	29.85	34.62	40.63	35.58	8.21	2.96	0.003
FAT (GM)	302	35.51	39.59	43.44	39.61	5.88	120	35.93	41.47	46.86	41.88	8.55	-2.67	0.008
CARBOHYDRATE (GM)	309	114.04	124.96	135.97	125.17	16.70	121	103.16	121.63	139.10	121.06	25.50	1.64	0.103
CALCIUM (MG)	307	451.54	585.35	689.96	576.52	162.00	122	290.38	395.99	584.24	443.81	195.00	6.67	0.000
IRON (MG)	309	5.36	6.03	7.14	6.41	1.70	118	5.52	6.49	7.74	7.04	2.74	-2.31	0.022
MAGNESIUM (MG)	307	116.74	134.56	154.60	136.02	28.20	121	88.82	108.32	134.12	115.89	42.80	4.78	0.000
PHOSPHORUS (MG)	308	604.89	687.38	767.76	686.48	133.00	121	460.20	552.62	720.25	588.10	156.00	6.13	0.000
VITAMIN A (IU)	309	1642.	2564.	4542.	4322.	5499.	121	1183.	1962.	2991.	2510.	2410.	4.74	0.000
THIAMIN (MG)	304	0.61	0.71	0.82	0.74	0.19	118	0.58	0.73	0.96	0.80	0.34	-1.94	0.055
RIBOFAVIN (MG)	304	0.92	1.13	1.32	1.20	0.48	120	0.75	1.01	1.26	1.04	0.41	3.36	0.001
NIACIN (MG)	304	6.43	7.60	9.62	8.25	2.84	116	6.36	8.37	10.94	9.05	4.19	-1.81	0.073
VITAMIN B6 (MG)	305	0.61	0.72	0.89	0.78	0.28	117	0.54	0.70	0.96	0.79	0.38	-0.36	0.721
VITAMIN B12 (MCG)	296	1.81	2.27	2.74	3.40	6.06	118	1.53	2.09	2.88	2.50	2.35	2.17	0.030
VITAMIN C (MG)	310	39.89	67.43	107.74	76.94	49.60	120	28.40	62.61	108.00	74.77	57.60	0.36	0.716
CHOLESTEROL (MG)	306	116.56	160.70	238.49	191.98	97.80	121	111.02	208.20	336.02	227.33	138.00	-2.58	0.011

Table 6 -30

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children across Sites

	ABSENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)	121	29.85	34.62	40.63	35.58	8.21	309	28.41	34.48	41.40	34.93	8.95	0.72	0.475
FAT (GM)	120	35.93	41.47	46.86	41.88	8.55	310	36.08	41.79	47.67	41.80	8.43	0.09	0.926
CARBOHYDRATE (GM)	121	103.16	121.63	139.10	121.06	25.50	306	105.36	122.62	137.79	122.75	23.90	-0.63	0.530
CALCIUM (MG)	122	290.38	395.99	584.24	443.81	195.00	312	301.55	422.10	558.77	436.79	196.00	0.34	0.737
IRON (MG)	118	5.52	6.49	7.74	7.04	2.74	308	5.31	6.11	7.25	6.86	4.06	0.51	0.609
MAGNESIUM (MG)	121	88.82	108.32	134.12	115.89	42.80	310	89.89	112.57	134.05	116.49	36.90	-0.13	0.893
PHOSPHORUS (MG)	121	460.20	552.62	720.25	588.10	156.00	310	476.30	576.66	712.22	600.69	180.00	-0.72	0.471
VITAMIN A (IU)	121	1183.	1962.	2991.	2510.	2410.	305	1151.	1735.	2677.	2538.	2829.	-0.10	0.919
THIAMIN (MG)	118	0.58	0.73	0.96	0.80	0.34	300	0.57	0.70	0.87	0.75	0.25	1.55	0.123
RIBOFAVIN (MG)	120	0.75	1.01	1.26	1.04	0.41	306	0.73	0.92	1.20	1.02	0.52	0.50	0.614
NIACIN (MG)	116	6.36	8.37	10.94	9.05	4.19	301	6.26	7.92	10.10	8.70	4.72	0.75	0.456
VITAMIN B6 (MG)	117	0.54	0.70	0.96	0.79	0.38	311	0.52	0.69	0.93	0.79	0.50	-0.08	0.940
VITAMIN B12 (MCG)	118	1.53	2.09	2.88	2.50	2.35	289	1.31	1.83	2.50	2.52	4.34	-0.06	0.953
VITAMIN C (MG)	120	28.40	62.61	108.00	74.77	57.60	314	26.17	53.78	104.88	71.69	58.50	0.50	0.620
CHOLESTEROL (MG)	121	111.02	208.20	336.02	227.33	138.00	308	106.18	154.61	290.11	208.13	139.00	1.30	0.196

Table 6 -31

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)														
Greene/Humphreys	109	35.15	39.63	44.22	39.95	6.83	90	30.84	36.57	42.56	36.64	8.10	3.07	0.002
St.Clair	70	31.65	37.17	41.18	36.55	6.98	65	27.29	33.16	40.57	34.26	8.72	1.68	0.096
Maricopa	57	34.99	37.66	42.94	37.97	7.45	50	27.11	34.01	41.61	35.27	9.44	1.63	0.107
Mingo	70	31.64	36.23	41.65	36.87	7.12	104	26.67	32.81	40.84	33.70	9.42	2.52	0.013
FAT (MG)														
Greene/Humphreys	107	35.53	38.84	43.17	39.25	5.77	88	34.41	40.47	47.78	40.87	9.64	-1.39	0.166
St Clair	71	35.74	40.18	43.48	39.21	6.10	68	38.80	42.96	47.14	42.69	7.08	-3.10	0.002
Maricopa	58	38.53	41.98	45.83	42.08	6.13	51	37.81	42.98	49.13	43.06	7.46	-0.73	0.464
Mingo	66	34.60	38.15	41.55	38.44	5.03	103	35.92	41.49	47.48	41.37	8.57	-2.79	0.006
CARBOHYDRATE (GM)														
Greene/Humphreys	110	114.56	124.84	135.34	124.90	14.90	87	103.14	122.15	137.60	123.08	26.90	0.57	0.567
St.Clair	71	117.06	126.63	138.94	128.38	16.70	67	106.69	123.05	132.72	120.80	20.10	2.40	0.018
Maricopa	58	110.11	119.26	130.08	118.86	18.70	50	100.84	116.53	132.31	119.14	23.50	-0.07	0.946
Mingo	70	116.85	126.37	139.88	127.58	16.60	102	106.77	123.34	140.69	125.53	24.10	0.66	0.510
CALCIUM (MG)														
Greene/Humphreys	110	503.64	605.38	677.64	596.60	145.00	90	290.90	369.28	519.37	406.89	181.00	8.05	0.000
St.Clair	70	423.48	541.46	654.10	536.47	168.00	38	223.32	368.31	494.84	381.27	179.00	5.25	0.000
Maricopa	58	410.81	568.29	712.90	580.57	190.00	51	354.42	488.75	577.79	494.81	225.00	2.13	0.035
Mingo	69	476.01	592.15	708.03	581.74	190.00	103	327.95	464.97	576.35	470.86	193.00	4.23	0.000

Table 6-31 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
IRON (MG)														
Greene/Humphreys	109	5.53	6.20	7.42	6.71	1.85	87	5.45	6.15	7.72	7.86	6.64	-1.58	0.118
St.Clair	70	5.33	5.88	6.90	6.26	1.33	68	5.35	5.98	7.04	6.58	2.32	-1.01	0.317
Maricopa	58	5.43	6.04	7.62	6.93	2.07	50	5.69	6.70	7.39	6.85	2.31	-0.74	0.459
Mingo	72	5.13	5.82	6.61	6.02	1.37	103	4.97	5.79	6.97	6.21	2.23	-0.70	0.488
MAGNESIUM (MG)														
Greene/Humphreys	110	123.94	138.89	160.04	141.59	25.20	89	96.71	114.16	129.76	120.67	37.80	4.48	0.000
St.Clair	71	121.11	135.17	156.36	140.42	30.20	68	82.47	106.34	125.79	107.42	34.10	6.04	0.000
Maricopa	58	105.38	120.41	145.48	125.85	32.20	51	80.63	112.95	152.47	116.17	41.20	1.35	0.179
Mingo	68	114.02	128.15	146.12	131.10	24.10	102	94.97	114.55	136.11	119.03	35.10	2.66	0.009
PHOSPHORUS (MG)														
Greene/Humphreys	109	640.94	713.40	798.01	727.23	117.00	87	469.13	550.83	701.64	585.49	163.00	6.83	0.000
St.Clair	70	563.35	665.94	725.74	646.29	139.00	68	386.10	529.56	660.08	535.05	175.00	4.13	0.000
Maricopa	58	604.81	664.25	764.60	675.60	134.00	51	483.53	580.88	728.10	623.97	183.00	1.68	0.097
Mingo	71	576.45	677.23	753.17	672.42	135.00	104	521.88	629.47	769.79	645.10	163.00	1.14	0.258
VITAMIN A (IU)														
Greene/Humphreys	107	1847.	3372.	7024.	6569.	8051.	89	1359.	2122.	3192.	3296.	3887.	3.72	0.000
St.Clair	72	1665.	2820.	4322.	3993.	3818.	66	879.	1374.	2030.	1881.	1926.	4.15	0.000
Maricopa	58	1360.	1821.	3429.	2920.	2543.	52	1383.	1891.	2663.	2438.	1948.	1.12	0.265
Mingo	72	1457.	2003.	3301.	2441.	1313.	98	1073.	1710.	2705.	2345.	2498.	0.33	0.743

Table 6 -31 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN (MG)														
Greene/Humphreys	108	0.64	0.72	0.83	0.76	0.19	84	0.60	0.78	0.98	0.82	0.30	-1.68	0.096
St.Clair	71	0.58	0.72	0.86	0.75	0.22	66	0.59	0.71	0.90	0.74	0.21	0.10	0.923
Maricopa	55	0.57	0.69	0.79	0.71	0.21	48	0.56	0.69	0.80	0.69	0.18	0.64	0.526
Mingo	69	0.61	0.71	0.81	0.72	0.16	102	0.56	0.67	0.86	0.72	0.25	-0.15	0.884
RIBOFLAVIN (MG)														
Greene/Humphreys	108	1.03	1.19	1.46	1.37	0.67	88	0.73	0.94	1.30	1.10	0.67	2.80	0.006
St.Clair	71	0.91	1.16	1.31	1.15	0.34	66	0.68	0.85	1.09	0.91	0.37	3.91	0.000
Maricopa	56	0.82	1.08	1.31	1.12	0.37	90	0.80	1.05	1.21	1.01	0.28	1.77	0.079
Mingo	71	0.91	1.05	1.24	1.08	0.25	102	0.76	0.93	1.21	1.03	0.54	0.72	0.470
NIACIN (MG)														
Greene/Humphreys	107	7.00	8.42	10.71	9.20	3.36	88	7.48	8.66	11.08	10.84	7.29	-1.72	0.088
St.Clair	71	6.65	7.93	9.35	8.21	2.17	67	7.13	8.09	10.02	8.62	2.59	-1.01	0.312
Maricopa	57	5.84	7.50	9.19	7.84	2.76	48	6.00	8.05	9.56	7.81	2.25	0.04	0.964
Mingo	69	5.98	6.82	8.37	7.35	2.19	98	5.31	7.07	8.91	7.44	2.96	-0.23	0.821
VITAMIN B6 (MG)														
Greene/Humphreys	108	0.64	0.77	0.93	0.81	0.24	87	0.63	0.74	1.01	0.98	0.76	-2.06	0.042
St.Clair	70	0.62	0.72	0.93	0.78	0.27	68	0.43	0.63	0.78	0.66	0.27	2.80	0.006
Maricopa	56	0.57	0.67	0.93	0.78	0.38	52	0.56	0.79	0.99	0.80	0.30	-0.21	0.837
Mingo	71	0.58	0.70	0.77	0.72	0.24	104	0.44	0.63	0.98	0.72	0.37	-0.17	0.865

Table 6 -31 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start and Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Present on Day of Recall and Non-Head Start Children within Site

	PRESENT IN HEAD START						NON HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN B12 (MCG)														
Greene/Humphreys	102	1.83	2.31	3.72	5.25	9.06	84	1.24	1.63	2.55	2.75	4.66	2.25	0.026
St Clair	67	1.71	2.25	2.62	2.38	1.21	63	1.36	1.68	2.16	1.81	0.69	3.30	0.001
Maricopa	56	1.83	2.44	3.14	2.70	1.54	48	1.00	1.97	3.01	2.34	1.12	1.42	0.160
Mingo	71	1.80	2.09	2.49	2.25	0.80	94	1.28	1.92	2.50	2.88	6.13	-0.99	0.327
VITAMIN C (MG)														
Greene/Humphreys	108	35.23	68.14	105.68	75.49	49.90	90	30.47	78.60	121.80	84.15	54.90	-1.15	0.252
St Clair	72	62.52	89.15	115.45	97.88	49.40	68	17.05	70.30	111.26	80.45	63.50	1.81	0.073
Maricopa	58	29.61	48.42	79.75	61.28	42.70	52	25.80	45.91	87.45	59.29	42.50	0.24	0.807
Mingo	72	35.74	58.01	89.63	70.78	48.80	104	19.00	42.33	74.70	61.38	62.60	1.12	0.265
CHOLESTEROL (MG)														
Greene/Humphreys	105	138.31	171.66	266.62	205.74	93.70	88	109.09	146.54	250.62	192.33	118.00	0.86	0.391
St Clair	71	153.18	201.80	270.77	208.37	92.90	66	117.66	157.77	262.67	195.21	113.00	0.74	0.460
Maricopa	58	114.98	142.64	250.71	182.22	119.00	52	94.05	204.21	322.71	231.72	161.00	-1.45	0.151
Mingo	72	107.08	130.14	185.78	155.56	80.50	102	101.33	153.80	316.05	218.10	157.00	-3.44	0.001

Table 6 -32

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)														
Greene/Humphreys	109	35.19	39.63	44.22	39.95	6.83	9	25.40	34.87	41.97	34.51	9.24	1.73	0.118
St Clair	70	31.65	37.17	41.18	36.55	6.98	32	31.81	35.11	40.02	36.03	7.20	0.34	0.733
Maricopa	57	34.90	37.66	42.94	37.97	7.45	41	29.93	33.75	40.30	35.09	8.84	1.72	0.089
Mingo	70	31.64	36.23	41.65	36.87	7.12	39	29.62	37.45	41.07	35.97	8.55	0.56	0.578
FAT (MG)														
Greene/Humphreys	107	35.53	38.84	43.17	39.25	5.77	10	27.45	42.46	47.94	39.50	10.40	-0.08	0.941
St Clair	71	35.74	40.18	43.48	39.21	6.10	31	38.68	44.36	49.24	43.88	7.88	-2.94	0.005
Maricopa	58	38.53	41.98	45.83	42.09	6.13	41	35.68	40.78	46.01	40.98	9.01	0.68	0.497
Mingo	66	34.60	38.15	41.55	38.44	5.03	38	36.19	40.64	45.88	41.85	8.05	-2.36	0.022
CARBOHYDRATE (GM)														
Greene/Humphreys	110	114.56	124.84	135.34	124.90	14.80	10	109.31	118.14	165.22	126.80	32.00	-0.19	0.856
St Clair	71	117.06	126.63	138.94	128.38	16.70	32	100.83	117.70	130.70	115.20	22.70	2.94	0.005
Maricopa	58	110.11	119.26	130.08	118.86	18.70	40	102.04	128.78	141.81	123.84	27.30	-1.00	0.319
Mingo	70	116.85	126.37	139.88	127.58	16.60	39	108.35	120.31	134.80	121.55	24.10	1.39	0.169
CALCIUM (MG)														
Greene/Humphreys	110	503.64	605.38	677.64	596.60	149.00	10	222.44	328.00	352.30	339.01	155.00	5.07	0.000
St Clair	70	423.48	541.46	654.10	536.47	168.00	32	244.06	305.06	567.26	384.04	180.00	4.05	0.000
Maricopa	58	410.81	568.29	712.90	580.57	190.00	41	302.09	477.23	646.85	480.22	197.00	2.53	0.013
Mingo	69	476.01	592.16	708.03	581.74	150.00	39	328.53	405.56	604.22	481.45	198.00	2.75	0.008

Table 6 -32 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
IRON (MG)														
Greene/Humphreys	109	5.53	6.20	7.42	6.71	1.85	9	6.35	6.72	8.22	6.88	1.26	-0.38	0.710
St.Clair	70	5.33	5.88	6.90	6.26	1.33	30	5.64	6.44	6.98	7.00	3.13	-1.26	0.216
Maricopa	58	5.43	6.04	7.62	6.53	2.07	40	5.53	6.70	7.72	6.79	1.88	-0.63	0.528
Mingo	72	5.13	5.82	6.61	6.02	1.37	39	5.48	6.21	8.09	7.36	3.40	-2.35	0.023
MAGNESIUM (MG)														
Greene/Humphreys	110	123.94	139.99	160.04	141.59	25.20	10	89.08	112.34	125.75	117.56	37.20	2.00	0.073
St.Clair	71	121.11	135.17	156.36	140.42	30.20	32	88.19	102.57	133.03	112.22	29.40	4.47	0.000
Maricopa	58	105.38	120.41	145.48	125.85	32.20	41	83.95	100.05	140.19	117.78	61.20	0.77	0.443
Mingo	68	114.02	128.15	146.12	131.10	24.10	38	98.42	112.51	132.51	116.52	28.30	2.68	0.009
PHOSPHORUS (MG)														
Greene/Humphreys	109	640.94	713.40	798.01	727.23	117.00	10	399.67	518.54	599.78	526.62	118.00	5.14	0.000
St.Clair	70	563.35	665.94	725.74	646.29	139.00	31	432.42	476.96	629.00	533.48	140.00	3.75	0.000
Maricopa	58	604.81	664.25	764.60	675.60	134.00	41	465.37	603.92	725.48	606.18	166.00	2.22	0.029
Mingo	71	576.45	677.23	753.17	672.42	135.00	39	498.70	590.51	742.64	628.28	153.00	1.50	0.137
VITAMIN A (IU)														
Greene/Humphreys	107	1847.	3372.	7024.	6569.	8051.	10	957.	2095.	2792.	2675.	2184.	3.74	0.001
St.Clair	72	1865.	2820.	4322.	3993.	3818.	32	1158.	1954.	2764.	2125.	1244.	3.73	0.000
Maricopa	58	1360.	1821.	3429.	2920.	2543.	40	955.	1490.	2725.	2526.	3260.	0.64	0.524
Mingo	72	1457.	2003.	3301.	2441.	1313.	39	1328.	2120.	3437.	2768.	2201.	-0.85	0.399

Table 6A-32 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN (MG)														
Greene/Humphreys	109	0.64	0.72	0.83	0.76	0.19	10	0.73	0.98	1.04	0.92	0.19	-2.63	0.024
St.Clair	71	0.59	0.72	0.86	0.75	0.22	32	0.58	0.71	0.95	0.81	0.35	-0.95	0.347
Maricopa	55	0.57	0.69	0.79	0.71	0.21	39	0.57	0.67	0.84	0.74	0.33	-0.53	0.597
Mingo	69	0.61	0.71	0.81	0.72	0.16	37	0.58	0.73	0.91	0.83	0.37	-1.70	0.097
RIBOFLAVIN (MG)														
Greene/Humphreys	106	1.03	1.19	1.46	1.37	0.67	10	0.63	1.02	1.26	1.06	0.45	1.99	0.068
St.Clair	71	0.91	1.16	1.31	1.15	0.34	31	0.73	0.90	1.04	0.91	0.26	3.90	0.000
Maricopa	56	0.82	1.08	1.31	1.12	0.37	40	0.76	1.00	1.22	1.06	0.46	0.68	0.501
Mingo	71	0.91	1.05	1.24	1.08	0.25	39	0.80	1.08	1.33	1.13	0.45	-0.71	0.478
NIACIN (MG)														
Greene/Humphreys	107	7.00	8.42	10.71	9.20	3.36	9	8.31	9.23	9.38	9.50	2.29	-0.36	0.722
St.Clair	71	6.65	7.83	9.35	8.21	2.17	28	6.53	8.40	11.05	9.26	4.68	-1.14	0.263
Maricopa	57	5.94	7.50	9.19	7.84	2.76	41	5.86	7.37	10.49	8.36	3.95	-0.74	0.464
Mingo	69	5.99	6.92	8.37	7.35	2.19	38	5.92	8.74	12.07	9.54	4.46	-2.85	0.006
VITAMIN B6 (MG)														
Greene/Humphreys	108	0.64	0.77	0.93	0.81	0.24	10	0.70	0.84	1.03	0.88	0.25	-0.87	0.405
St.Clair	70	0.62	0.72	0.93	0.78	0.27	29	0.41	0.68	0.83	0.68	0.29	1.71	0.093
Maricopa	56	0.57	0.67	0.93	0.78	0.38	41	0.54	0.64	1.06	0.81	0.39	-0.37	0.710
Mingo	71	0.58	0.70	0.77	0.72	0.24	37	0.54	0.72	0.96	0.83	0.45	-1.43	0.160

Table 6 -32 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Groups Present and Absent Day of Recall within Site

	PRESENT IN HEAD START						ABSENT FROM HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN B12 (MCG)														
Greene/Humphreys	102	1.83	2.31	3.22	5.25	9.96	8	0.89	1.16	1.81	1.53	1.00	3.55	0.001
St.Clair	67	1.71	2.25	2.62	2.38	1.21	32	1.51	1.98	2.61	2.22	1.27	0.56	0.578
Maricopa	56	1.83	2.44	3.14	2.70	1.54	40	1.64	2.24	3.21	2.94	3.65	-0.38	0.703
Mingo	71	1.80	2.09	2.49	2.25	0.80	38	1.61	2.28	2.88	2.47	1.22	-1.00	0.323
VITAMIN C (MG)														
Greene/Humphreys	108	35.23	68.14	106.68	75.49	49.90	10	25.88	96.05	112.03	87.20	64.90	-0.56	0.591
St.Clair	72	62.52	89.15	115.45	97.89	49.40	31	53.10	88.89	119.66	92.53	55.50	0.46	0.644
Maricopa	58	29.61	48.42	79.75	61.28	42.70	41	23.02	40.78	112.95	69.81	65.50	-0.73	0.467
Mingo	72	35.74	58.01	89.63	70.78	48.80	38	31.57	58.85	78.01	62.36	45.10	0.90	0.368
CHOLESTEROL (MG)														
Greene/Humphreys	105	138.31	171.66	266.62	205.74	93.70	9	106.66	146.21	248.94	182.83	115.00	0.58	0.574
St.Clair	71	153.18	201.80	270.77	208.37	92.90	32	108:75	166.91	307.08	206.47	105.00	0.09	0.930
Maricopa	58	114.98	142.64	250.71	192.22	119.00	41	112.35	211.15	347.44	249.05	172.00	-1.83	0.072
Mingo	72	107.08	130.14	185.78	155.56	80.50	39	117.02	243.17	344.03	231.88	125.00	-3.44	0.001

Table 6-33

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
PROTEIN (GM)														
Greene/Humphreys	9	25.40	34.87	41.97	34.51	9.24	90	30.84	36.57	42.56	36.64	8.10	-0.67	0.520
St.Clair	32	31.81	35.11	40.02	36.03	7.20	65	27.29	33.16	40.57	34.26	8.72	1.06	0.293
Maricopa	41	29.93	33.25	40.30	35.09	8.64	50	27.11	34.01	41.61	35.27	9.44	-0.10	0.923
Mingo	39	28.62	37.45	41.07	35.97	8.55	104	26.67	32.81	40.84	33.70	9.42	1.37	0.174
FAT (MG)														
Greene/Humphreys	10	27.45	42.46	47.84	39.50	10.40	88	34.41	40.47	47.78	40.87	9.64	-0.40	0.697
St.Clair	31	38.68	44.36	49.24	43.88	7.88	68	38.80	42.56	47.14	42.69	7.08	0.72	0.476
Maricopa	41	35.68	40.78	46.01	40.98	9.01	51	37.81	42.98	49.13	43.06	7.46	-1.19	0.240
Mingo	38	36.19	40.66	45.88	41.85	8.05	103	35.92	41.49	47.48	41.37	8.57	0.31	0.758
CARBOHYDRATE (GM)														
Greene/Humphreys	10	109.31	118.14	165.22	126.80	32.00	87	103.14	122.15	137.60	123.08	26.50	0.35	0.730
St.Clair	32	100.83	117.70	130.70	115.20	22.70	67	106.69	123.05	132.72	120.80	20.10	-1.19	0.239
Maricopa	40	102.04	128.78	141.81	123.84	27.30	50	100.84	116.53	132.31	119.14	23.50	0.86	0.391
Mingo	39	108.35	120.31	134.80	121.55	24.10	102	106.77	123.34	140.69	125.53	24.10	-0.88	0.382
CALCIUM (MG)														
Greene/Humphreys	10	222.44	328.00	352.30	339.01	155.00	90	290.90	369.28	519.37	406.89	181.00	-1.29	0.220
St.Clair	32	244.06	300.06	567.26	384.04	180.00	68	223.32	368.31	494.84	381.27	179.00	0.07	0.943
Maricopa	41	302.09	477.23	646.85	480.22	197.00	51	354.42	488.75	577.79	494.81	225.00	-0.33	0.741
Mingo	39	328.53	405.56	604.22	481.45	198.00	103	327.95	464.97	576.35	470.86	193.00	0.29	0.775

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Table 6-33 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	t	P
IRON (MG)														
Greene/Humphreys	9	6.35	6.72	8.22	6.88	1.26	87	5.45	6.15	7.72	7.86	6.64	-1.19	0.238
St.Clair	30	5.64	6.44	6.98	7.00	3.13	68	5.35	5.98	7.04	6.58	2.32	0.66	0.510
Maricopa	40	5.53	6.70	7.72	6.79	1.88	50	5.69	6.70	7.35	6.85	2.31	-0.14	0.892
Mingo	39	5.48	6.21	8.09	7.36	3.40	103	4.97	5.79	6.97	6.21	2.23	1.95	0.056
MAGNESIUM (MG)														
Greene/Humphreys	10	89.08	112.34	125.75	117.56	37.20	89	96.71	114.16	129.76	120.67	37.80	-0.25	0.807
St.Clair	32	88.19	102.57	133.03	112.22	29.40	68	82.47	106.34	125.79	107.42	34.10	0.72	0.472
Maricopa	41	83.95	100.05	140.19	117.78	61.20	51	80.63	112.95	152.47	116.17	41.20	0.14	0.886
Mingo	38	98.42	112.51	132.51	116.52	28.30	102	94.97	114.55	136.11	119.03	35.10	-0.44	0.663
PHOSPHORUS (MG)														
Greene/Humphreys	10	399.67	518.54	598.78	526.62	118.00	87	469.13	550.83	701.64	585.49	163.00	-1.43	0.177
St.Clair	31	432.42	476.96	629.00	533.48	140.00	68	386.10	529.56	660.08	535.05	175.00	-0.05	0.962
Maricopa	41	465.37	603.92	725.48	606.18	166.00	51	483.53	580.88	728.10	623.57	183.00	-0.48	0.634
Mingo	39	498.70	590.51	742.64	628.28	153.00	104	521.88	629.47	769.79	645.10	183.00	-0.55	0.581
VITAMIN A (IU)														
Greene/Humphreys	10	957.	2095.	2792.	2675.	2184.	89	1359.	2122.	3192.	3296.	3887.	-0.77	0.451
St.Clair	32	1158.	1954.	2764.	2125.	1244.	66	879.	1374.	2030.	1881.	1926.	0.75	0.453
Maricopa	40	955.	1490.	2725.	2526.	3260.	52	1383.	1891.	2663.	2438.	1948.	0.15	0.880
Mingo	39	1328.	2120.	3437.	2768.	2201.	98	1073.	1710.	2705.	2345.	2458.	0.98	0.329

Table 6-33 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
THIAMIN (MG)														
Greene/Humphreys	10	0.73	0.98	1.04	0.92	0.19	84	0.60	0.78	0.98	0.82	0.30	1.48	0.160
St.Clair	32	0.58	0.71	0.95	0.81	0.35	66	0.59	0.71	0.90	0.74	0.21	1.00	0.321
Maricopa	39	0.57	0.67	0.84	0.74	0.33	48	0.56	0.69	0.80	0.69	0.18	0.97	0.337
Mingo	37	0.58	0.73	0.91	0.83	0.37	102	0.56	0.67	0.86	0.72	0.25	1.58	0.120
RIBOFLAVIN (MG)														
Greene/Humphreys	10	0.63	1.02	1.26	1.06	0.45	88	0.73	0.94	1.30	1.10	0.67	-0.25	0.805
St.Clair	31	0.73	0.90	1.04	0.91	0.26	66	0.68	0.85	1.09	0.91	0.37	-0.02	0.987
Maricopa	40	0.76	1.00	1.22	1.06	0.46	50	0.80	1.05	1.21	1.01	0.28	0.64	0.528
Mingo	39	0.80	1.08	1.33	1.13	0.45	102	0.76	0.93	1.21	1.03	0.54	1.11	0.269
NIACIN (MG)														
Greene/Humphreys	9	8.31	9.23	9.38	9.50	2.29	88	7.48	8.66	11.08	10.64	7.29	-1.05	0.301
St.Clair	28	6.53	8.40	11.05	9.26	4.68	67	7.13	8.09	10.02	8.62	2.59	0.68	0.503
Maricopa	41	5.86	7.37	10.49	8.36	3.95	48	6.00	8.05	9.56	7.81	2.25	0.79	0.433
Mingo	38	5.92	8.74	12.07	9.54	4.46	98	5.31	7.07	8.91	7.44	2.96	2.69	0.010
VITAMIN B6 (MG)														
Greene/Humphreys	10	0.70	0.84	1.03	0.88	0.25	87	0.63	0.74	1.01	0.98	0.76	-0.92	0.363
St.Clair	29	0.41	0.68	0.83	0.68	0.29	68	0.43	0.63	0.78	0.66	0.27	0.34	0.736
Maricopa	41	0.54	0.64	1.06	0.81	0.39	52	0.56	0.79	0.99	0.80	0.30	0.22	0.830
Mingo	37	0.54	0.72	0.96	0.83	0.45	104	0.44	0.63	0.98	0.72	0.37	1.28	0.206

Table 6-13 (continued)

Nutrient Density: Nutrient Intake Per 1000 Kilocalories for Posttested Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between those Absent on Day of Recall and Non-Head Start Children within Site

	ABSENT IN HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN B12 (MCG)														
Greene/Humphreys	8	0.89	1.16	1.81	1.53	1.00	84	1.24	1.63	2.55	2.75	4.66	-1.97	0.054
St.Clair	32	1.51	1.98	2.61	2.22	1.27	63	1.36	1.68	2.16	1.81	0.69	1.72	0.094
Maricopa	40	1.64	2.24	3.21	2.94	3.65	48	1.60	1.97	3.01	2.34	1.12	1.01	0.319
Mingo	38	1.61	2.28	2.88	2.47	1.22	94	1.28	1.92	2.50	2.88	6.13	-0.62	0.536
VITAMIN C (MG)														
Greene/Humphreys	10	25.88	96.05	112.03	87.20	64.90	90	39.47	78.60	121.89	84.15	54.90	0.14	0.889
St.Clair	31	53.10	88.89	119.66	92.53	55.50	68	17.85	70.39	111.28	80.45	63.50	0.96	0.341
Maricopa	41	23.02	40.78	112.95	69.81	65.50	52	25.80	45.91	87.45	59.29	42.50	0.89	0.376
Mingo	38	31.57	58.85	78.01	62.36	45.10	104	19.00	42.33	74.79	61.38	62.60	0.10	0.918
CHOLESTEROL (MG)														
Greene/Humphreys	9	106.66	146.21	248.94	182.83	115.00	88	109.09	146.54	250.62	192.33	118.00	-0.24	0.818
St.Clair	32	108.75	166.91	307.08	206.47	105.00	66	117.66	157.77	262.67	195.21	113.00	0.49	0.628
Maricopa	41	112.35	211.15	347.44	249.05	172.00	52	94.05	204.21	322.71	231.72	161.00	0.50	0.621
Mingo	39	117.02	243.17	344.03	231.88	125.00	102	101.33	153.80	316.05	218.10	157.00	0.54	0.588

Table 6-34

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Protein	708	Greene & Humphreys	1.69**	0.55
		St. Clair	-1.01	0.59
		Maricopa	0.37	0.68
		Mingo	-1.05*	0.54
		Program		
		Head Start Present vs. Non-Head Start	2.76***	0.68
		Head Start Present vs. Head Start Absent	1.64	0.90
		Head Start Absent vs. Non-Head Start	1.12	0.90
		Constant	37.73	
		Statistics $F = 3.76$ $R^2 = 0.06$ $MS_e = 64.99$		
		Site		
Fat	705	Greene & Humphreys	-0.86	0.51
		St. Clair	-0.12	0.55
		Maricopa	1.78**	0.63
		Mingo	-0.79	0.50
		Program		
		Head Start Present vs. Non-Head Start	-2.30***	0.64
		Head Start Present vs. Head Start Absent	-1.96	0.86
		Head Start Absent vs. Non-Head Start	-0.32	0.86
		Constant	42.64	
		Statistics $F = 2.82$ $R^2 = 0.04$ $MS_e = 56.61$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Carbohydrate	709	Greene & Humphreys	0.70	1.46
		St. Clair	1.14	1.56
		Maricopa	-4.79**	1.80
		Mingo	2.94*	1.42
		Program		
		Head Start Present vs. Non-Head Start	2.80	1.84
		Head Start Present vs. Head Start Absent	4.14	2.42
		Head Start Absent vs. Non-Head Start	-1.34	2.44
		Constant	118.07	
		Statistics $F =$ 1.61 $R^2 =$ 0.03 $MS_e =$ 461.14		
		Site		
Calcium	713	Greene & Humphreys	-4.50	12.19
		St. Clair	-50.11***	13.06
		Maricopa	28.11	15.09
		Mingo	26.50*	11.97
		Program		
		Head Start Present vs. Non-Head Start	140.14***	15.36
		Head Start Present vs. Head Start Absent	131.74***	20.22
		Head Start Absent vs. Non-Head Start	472.89	
		Constant		
		Statistics $F =$ 12.27 $R^2 =$ 0.16 $MS_e =$ 32466.59		

[a] Significance shown as:

*$p \le .05$
**$p \le .01$
***$p \le .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	se_b
		Site		
Iron	707	Greene & Humphreys	0.57**	0.20
		St. Clair	-0.60	0.22
		Maricopa	-0.24	0.25
		Mingo	-0.27	0.20
		Program		
		Head Start Present vs. Non-Head Start	-0.32*	0.16
		Head Start Present vs. Head Start Absent	-0.40*	0.20
		Head Start Absent vs. Non-Head Start	0.10	0.20
		Constant	5.21	
		Statistics $F =$ 4.18 $R^2 =$ 0.06 $MS_e =$ 8.93		
		Site		
Magnesium	710	Greene & Humphreys	4.29	2.32
		St. Clair	-1.27	2.47
		Maricopa	-4.59	2.06
		Mingo	1.57	2.29
		Program		
		Head Start Present vs. Non-Head Start	17.98***	2.74
		Head Start Present vs. Head Start Absent	19.16***	3.62
		Head Start Absent vs. Non-Head Start	112.40	
		Constant		
		Statistics $F =$ 8.71 $R^2 =$ 0.12 $MS_e =$ 1169.34		

[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Phosphorus	712	Greene & Humphreys	11.77	10.52
		St. Clair	-53.53***	11.20
		Maricopa	15.77	12.95
		Mingo	25.99*	10.25
		Program		
		Head Start Present vs. Non-Head Start	90.90***	13.16
		Head Start Present vs. Head Start Absent	86.18***	17.34
		Head Start Absent vs. Non-Head Start	4.72	17.38
		Constant	645.89	
		Statistics F = 8.48 R^2 = 0.12 MS_e = 24007.04		
		Site		
Vitamin A	761	Greene & Humphreys	1222.13***	248.68
		St. Clair	-500.67	263.47
		Maricopa	-253.03	304.51
		Mingo	-442.95	247.78
		Program		
		Head Start Present vs. Non-Head Start	1944.68***	332.64
		Head Start Present vs. Head Start Absent	1331.82	436.72
		Head Start Absent vs. Non-Head Start	612.88	440.30
		Constant	3871.72	
		Statistics F = 9.21 R^2 = 0.12 MS_e = 14649054.35		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Thiamin	694	Greene & Humphreys	0.52**	0.02
		St. Clair	0.16	0.02
		Maricopa	-0.66**	0.02
		Mingo	-0.16	0.02
		Program		
		Head Start Present vs. Non-Head Start	-0.02	0.02
		Head Start Present vs. Head Start Absent	-0.06*	0.02
		Head Start Absent vs. Non-Head Start	0.04	0.02
		Constant	0.68	
		Statistics F = 2.41 R^2 = 0.04 MS_e = 0.06		
		Site		
Riboflavin	704	Greene & Humphreys	0.12***	0.03
		St. Clair	-0.62	0.03
		Maricopa	-0.44	0.04
		Mingo	-0.15	0.03
		Program		
		Head Start Present vs. Non-Head Start	0.06***	0.04
		Head Start Present vs. Head Start Absent	0.12**	0.04
		Head Start Absent vs. Non-Head Start	0.06	0.04
		Constant	1.05	
		Statistics F = 6.17 R^2 = 0.09 MS_e = 0.21		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] se_b
		Site		
Niacin	695	Greene & Humphreys	1.30***	0.26
		St. Clair	0.18	0.28
		Maricopa	−0.86**	0.33
		Mingo	−0.62*	0.26
		Program		
		Head Start Present vs. Non-Head Start	−0.46	0.26
		Head Start Present vs. Head Start Absent	−0.62	0.36
		Head Start Absent vs. Non-Head Start	0.14	0.36
		Constant	8.53	
		Statistics $F =$ 6.43 $R^2 =$ 0.09 $MS_e =$ 14.61		
		Site		
Vitamin B6	706	Greene & Humphreys	0.98***	0.03
		St. Clair	−0.55	0.03
		Maricopa	−0.11	0.03
		Mingo	−0.33	0.03
		Program		
		Head Start Present vs. Non-Head Start	0.00	0.02
		Head Start Present vs. Head Start Absent	−0.02	0.04
		Head Start Absent vs. Non-Head Start	0.02	0.04
		Constant	0.69	
		Statistics $F =$ 3.50 $R^2 =$ 0.05 $MS_e =$ 0.15		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Vitamin B12	730	Greene & Humphreys	0.84	0.71
		St. Clair	0.77	0.75
		Maricopa	-0.60	0.86
		Mingo	-1.35	0.70
		Program		
		Head Start Present vs. Non-Head Start	0.48***	0.12
		Head Start Present vs. Head Start Absent	0.14	0.16
		Head Start Absent vs. Non-Head Start	0.34*	0.16
		Constant	1.79	
		Statistics $F = 1.20$ $R^2 = 0.03$ $MS_e = 111.88$		
		Site		
Vitamin C	717	Greene & Humphreys	3.58	3.61
		St. Clair	14.24***	3.91
		Maricopa	-9.69*	4.48
		Mingo	-8.14*	3.56
		Program		
		Head Start Present vs. Non-Head Start	2.44	4.32
		Head Start Present vs. Head Start Absent	-6.58	5.70
		Head Start Absent vs. Non-Head Start	9.00	5.72
		Constant	81.97	
		Statistics $F = 3.77$ $R^2 = 0.05$ $MS_e = 2919.36$		

[a] Significance shown as:

$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-34 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) across Sites

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	se_b
		Site		
Cholesterol	708	Greene & Humphreys	-8.94	8.23
		St. Clair	-7.33	8.68
		Maricopa	25.31*	10.02
		Mingo	-9.04	7.95
		Program		
		Head Start Present vs. Non-Head Start	-15.40	10.26
		Head Start Present vs. Head Start Absent	-35.44**	13.56
		Head Start Absent vs. Non-Head Start	20.06	13.58
		Constant	238.94	

Statistics $F = 1.56$ $R^2 = 0.02$ $MS_e = 14340.18$

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[a] Significance shown as:

*p ≤ .05
**p ≤ .01
***p ≤ .001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] SE_b
Protein	196	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	2.78 *	1.14
		Head Start-Present vs. Head Start-Absent	4.44	2.62
		Head Start-Absent vs. Non-Head Start	1.66	2.62
		Constant	26.81	
	Statistics	F = 1.93 R^2 = 0.08	MS_e = 54.78	
	169	St. Clair		
		Head Start-Present vs. Non-Head Start	1.68	1.42
		Head Start-Present vs. Head Start-Absent	-0.92	1.72
		Head Start-Absent vs. Non-Head Start	-2.60	1.70
		Constant	42.32	
	Statistics	F = 1.73 R^2 = 0.08	MS_e = 56.98	
	143	Maricopa		
		Head Start-Present vs. Non-Head Start	2.12	1.64
		Head Start-Present vs. Head Start-Absent	2.00	1.70
		Head Start-Absent vs. Non-Head Start	-5.16	3.32
		Constant	25.39	
	Statistics	F = 0.88 R^2 = 0.05	MS_e = 64.67	
	204	Mingo		
		Head Start-Present vs. Non-Head Start	3.12	1.96
		Head Start-Present vs. Head Start-Absent	1.32	0.07
		Head Start-Absent vs. Non-Head Start	-1.80	68.85
		Constant	36.55	
	Statistics	F = 1.96 R^2 = 0.07	MS_e = 68.85	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, gender, race, per capita income, family employment status and mother's education.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Fat	195	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-1.20	1.24
		Head Start-Present vs. Head Start-Absent	0.50	2.70
		Head Start-Absent vs. Non-Head Start	1.70	2.72
		Constant	41.49	
		Statistics F = 1.00 R^2 = 0.04	MS_e = 64.52	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	-3.98 **	1.24
		Head Start-Present vs. Head Start-Absent	-5.08 ***	1.52
		Head Start-Absent vs. Non-Head Start	-1.10	1.52
		Constant	42.69	
		Statistics F = 4.54 R^2 = 0.19	MS_e = 43.48	
	145	Maricopa		
		Head Start-Present vs. Non-Head Start	-1.66	1.48
		Head Start Present vs. Head Start-Absent	1.04	1.56
		Head Start-Absent vs. Non-Head Start	1.35	1.62
		Constant	37.00	
		Statistics F = 1.37 R^2 = 0.07	MS_e = 54.52	
	198	Mingo		
		Head Start-Present vs. Non-Head Start	-2.98 *	1.30
		Head Start-Present vs. Head Start-Absent	-3.98 *	1.62
		Head Start-Absent vs. Non-Head Start	-0.98	1.54
		Constant	44.18	
		Statistics F = 1.38 R^2 = 0.06	MS_e = 57.78	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, gender, race, per capita income, family employment status and mother's education.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	Effects[c] SE_b
Carbohydrate	197	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.60	3.40
		Head Start-Present vs. Head Start-Absent	-3.00	7.32
		Head Start-Absent vs. Non-Head Start	-3.60	7.38
		Constant	124.07	
		Statistics $F = 0.52$ $R^2 = 0.02$	$MS_e = 476.38$	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	8.78 *	3.46
		Head Start-Present vs. Head Start-Absent	15.32 ***	4.16
		Head Start-Absent vs. Non-Head Start	6.54	4.12
		Constant	110.46	
		Statistics $F = 5.16$ $R^2 = 0.21$	$MS_e = 331.04$	
	143	Maricopa		
		Head Start-Present vs. Non-Head Start	1.86	4.58
		Head Start-Present vs. Head Start-Absent	-4.60	4.80
		Head Start-Absent vs. Non-Head Start	-6.46	5.04
		Constant	150.50	
		Statistics $F = 0.98$ $R^2 = 0.06$	$MS_e = 515.16$	
	201	Mingo		
		Head Start-Present vs. Non-Head Start	2.62	3.68
		Head Start-Present vs. Head Start-Absent	8.04	4.60
		Head Start-Absent vs. Non-Head Start	5.44	4.38
		Constant	116.59	
		Statistics $F = 0.87$ $R^2 = 0.03$	$MS_e = 481.12$	

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[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, gender, race, per capita income, family employment status and mother's education.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Calcium	198	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	189.26 ***	24.96
		Head Start-Present vs. Head Start-Absent	251.04 ***	53.90
		Head Start-Absent vs. Non-Head Start	61.74	54.30
		Constant	424.73	
		Statistics $F = 11.18$ $R^2 = 0.32$	$MS_e = 25812.65$	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	166.22 ***	32.08
		Head Start-Present vs. Head Start-Absent	107.74 **	38.52
		Head Start-Absent vs. Non-Head Start	-8.48	38.10
		Constant	398.04	
		Statistics $F = 6.73$ $R^2 = 0.25$	$MS_e = 28413.09$	
	142	Maricopa		
		Head Start-Present vs. Non-Head Start	81.08 *	41.32
		Head Start-Present vs. Head Start Absent	77.44	42.78
		Head Start-Absent vs. Non-Head Start	160.42	86.32
		Constant	486.43	
		Statistics $F = 1.34$ $R^2 = 0.07$	$MS_e = 41110.91$	
	204	Mingo		
		Head Start-Present vs. Non-Head Start	107.16 ***	30.34
		Head Start-Present vs. Head Start-Absent	102.22 **	38.06
		Head Start-Absent vs. Non-Head Start	-4.94	36.36
		Constant	512.86	
		Statistics $F = 2.53$ $R^2 = 0.09$	$MS_e = 33179.52$	

[a] Significance shown as:
*$p < .05$
**$p < .01$
***$p < .001$

[b] Adjusted for age, gender, race, per capita income, family employment status and mother's education.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Iron	187	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.04	0.30
		Head Start-Present vs. Head Start-Absent	-0.03	0.66
		Head Start-Absent vs. Non-Head Start	-0.30	0.66
		Constant	6.07	
	Statistics	F = 0.26 R^2 = 0.01	MS_e = 3.38	
	164	St. Clair		
		Head Start-Present vs. Non-Head Start	-1.00	0.34
		Head Start-Present vs. Head Start-Absent	-0.32	0.42
		Head Start-Absent vs. Non-Head Start	-0.18	0.42
		Constant	4.52	
	Statistics	F = 0.93 R^2 = 0.05	MS_e = 3.22	
	139	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.58	1.30
		Head Start-Present vs. Head Start-Absent	-0.62	0.07
		Head Start-Absent vs. Non-Head Start	-0.82	3.60
		Constant	6.78	
	Statistics	F = ____ R^2 = ____	MS_e = ____	
	200	Mingo		
		Head Start-Present vs. Non-Head Start	-0.28	0.24
		Head Start-Present vs. Head Start-Absent	-0.48	0.32
		Head Start-Absent vs. Non-Head Start	-0.20	0.32
		Constant	4.77	
	Statistics	F = 3.47 R^2 = 0.13	MS_e = 2.18	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, gender, race, per capita income, family employment status and mother's education.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Magnesium	211	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	16.52 ***	4.96
		Head Start-Present vs. Head Start-Absent	21.02 *	10.70
		Head Start-Absent vs. Non-Head Start	4.52	10.78
		Constant	101.39	
		Statistics $F = 3.98$ $R^2 = 0.14$	$MS_e = 1017.26$	
	168	St. Clair		
		Head Start-Present vs. Non-Head Start	26.08 ***	5.82
		Head Start-Present vs. Head Start-Absent	24.06 ***	7.06
		Head Start-Absent vs. Non-Head Start	-2.02	6.96
		Constant	0.27	
		Statistics $F = 7.49$ $R^2 = 0.27$	$MS_e = 955.55$	
	144	Maricopa		
		Head Start-Present vs. Non-Head Start	14.02 *	7.08
		Head Start-Present vs. Head Start-Absent	16.44 **	7.42
		Head Start-Absent vs. Non-Head Start	2.44	7.78
		Constant	128.52	
		Statistics $F = 1.39$ $R^2 = 0.08$	$MS_e = 1235.19$	
	201	Mingo		
		Head Start-Present vs. Non-Head Start	11.30 *	4.98
		Head Start-Present vs. Head Start-Absent	14.40	6.20
		Head Start-Absent vs. Non-Head Start	3.10	5.92
		Constant	138.75	
		Statistics $F = 4.18$ $R^2 = 0.15$	$MS_e = 872.65$	

[a] Significance shown as:
*$p < .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Phosphorous	211	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	138.48 ***	21.20
		Head Start-Present vs. Head Start-Absent	188.94 ***	45.82
		Head Start-Absent vs. Non-Head Start	50.46	46.14
		Constant	616.80	
		Statistics F = 9.05 R^2 = 0.28	MS_e = 18653.28	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	79.52 **	28.74
		Head Start-Present vs. Head Start-Absent	56.68	34.52
		Head Start-Absent vs. Non-Head Start	-22.84	34.14
		Constant	590.51	
		Statistics F = 5.43 R^2 = 0.22	MS_e = 22799.71	
	144	Maricopa		
		Head Start-Present vs. Non-Head Start	56.56	31.42
		Head Start-Present vs. Head Start-Absent	60.82	32.70
		Head Start-Absent vs. Non-Head Start	4.28	34.06
		Constant	562.14	
		Statistics F = 1.22 R^2 = 0.07	MS_e = 24208.30	
	204	Mingo		
		Head Start-Present vs. Non-Head Start	31.58	26.60
		Head Start-Present vs. Head Start-Absent	39.22	33.34
		Head Start-Absent vs. Non-Head Start	7.64	31.90
		Constant	687.98	
		Statistics F = 1.60 R^2 = 0.06	MS_e = 25494.58	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	SE_b
Vitamin A	196	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.28 ***	0.06
		Head Start-Present vs. Head Start-Absent	0.38 **	0.12
		Head Start-Absent vs. Non-Head Start	0.12	0.12
		Constant	3.35	
		Statistics F = 5.29 R^2 = 0.18	MS_e = 0.14	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	0.32 ***	0.06
		Head Start-Present vs. Head Start-Absent	0.20 **	0.08
		Head Start-Absent vs. Non-Head Start	-0.10	0.08
		Constant	3.10	
		Statistics F = 7.33 R^2 = 0.27	MS_e = 0.10	
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	0.10	0.06
		Head Start-Present vs. Head Start-Absent	0.18 **	0.06
		Head Start-Absent vs. Non-Head Start	0.10	0.06
		Constant	3.74	
		Statistics F = 3.10 R^2 = 0.16	MS_e = 0.09	
	200	Mingo		
		Head Start-Present vs. Non-Head Start	0.22 ***	4.19
		Head Start-Present vs. Head Start-Absent	0.12 *	0.15
		Head Start-Absent vs. Non-Head Start	-0.10	0.08
		Constant	3.40	
		Statistics F = 4.19 R^2 = 0.15	MS_e = 0.08	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Thiamin	193	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.08 *	0.04
		Head Start-Present vs. Head Start-Absent	-0.16 *	0.08
		Head Start-Absent vs. Non-Head Start	-0.10	0.08
		Constant	0.67	
		Statistics F = 1.38 R^2 = 0.05	MS_e = 0.06	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	-0.06	0.04
		Head Start-Present vs. Head Start-Absent	-0.30	0.06
		Head Start-Absent vs. Non-Head Start	0.04	0.06
		Constant	0.60	
		Statistics F = 1.94 R^2 = 0.08	MS_e = 0.57	
	139	Maricopa		
		Head Start-Present vs. Non-Head Start	0.04	0.04
		Head Start-Present vs. Head Start-Absent	-0.28	0.14
		Head Start-Absent vs. Non-Head Start	-0.38	0.06
		Constant	1.40	
		Statistics F = 1.37 R^2 = 0.08	MS_e = 0.05	
	198	Mingo		
		Head Start-Present vs. Non-Head Start	0.02	0.04
		Head Start-Present vs. Head Start-Absent	-0.08	0.04
		Head Start-Absent vs. Non-Head Start	-0.08	0.04
		Constant	0.66	
		Statistics F = 0.99 R^2 = 0.04	MS_e = 0.05	

[a] Significance shown as:
*$p < .05$
**$p < .01$
***$p < .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Riboflavin	188	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.24 ***	0.06
		Head Start-Present vs. Head Start-Absent	0.30 *	0.14
		Head Start-Absent vs. Non-Head Start	0.06	0.14
		Constant	1.28	
	Statistics	F = 2.39 R^2 = 0.10	MS_e = 0.17	
	166	St. Clair		
		Head Start-Present vs. Non-Head Startt	0.18 **	0.06
		Head Start-Present vs. Head Start-Absent	0.14	0.08
		Head Start-Absent vs. Non-Head Start	-0.04	0.08
		Constant	0.63	
	Statistics	F = 5.04 R^2 = 0.20	MS_e = 0.11	
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	0.08	0.08
		Head Start-Present vs. Head Start-Absent	0.06	0.08
		Head Start-Absent vs. Non-Head Start	-0.02	0.08
		Constant	1.35	
	Statistics	F = 0.57 R^2 = 0.03	MS_e = 0.11	
	202	Mingo		
		Head Start-Present vs. Non-Head Start	0.84	0.06
		Head Start-Present vs. Head Start-Absent	0.02	0.06
		Head Start-Absent vs. Non-Head Start	-0.06	0.06
		Constant	0.99	
	Statistics	F = 1.41 R^2 = 0.06	MS_e = 0.10	

[a] Significance shown as:
*$p < .05$
**$p < .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c]	
			b	SE_b
Niacin	191	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.94	0.54
		Head Start-Present vs. Head Start-Absent	-0.70	1.22
		Head Start-Absent vs. Non-Head Start	0.24	1.24
		Constant	9.84	
	Statistics	$F = 1.22$ $R^2 = 0.05$	$MS_e = 11.95$	
	167	St. Clair		
		Head Start-Present vs. Non-Head Start	-0.62	0.48
		Head Start-Present vs. Head Start-Absent	-0.78	0.60
		Head Start-Absent vs. Non-Head Start	-0.16	0.60
		Constant	6.80	
	Statistics	$F = 1.42$ $R^2 = 0.07$	$MS_e = 6.63$	
	140	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.30	0.88
		Head Start-Present vs. Head Start-Absent	0.18	0.56
		Head Start-Absent vs. Non-Head Start	0.22	0.58
		Constant	6.09	
	Statistics	$F = 0.37$ $R^2 = 0.02$	$MS_e = 6.83$	
	200	Mingo		
		Head Start-Present vs. Non-Head Start	-0.10	0.54
		Head Start-Present vs. Head Start-Absent	-0.86	0.70
		Head Start-Absent vs. Non-Head Start	-0.76	0.66
		Constant	7.78	
	Statistics	$F = 0.00$ $R^2 = 0.03$	$MS_e = 0.43$	

[a] Significance shown as:
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin B_6	190	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-0.06	0.04
		Head Start-Present vs. Head Start-Absent	-0.10	0.10
		Head Start-Absent vs. Non-Head Start	-0.04	0.10
		Constant	0.73	
		Statistics $F = 0.87$ $R^2 = 0.03$ $MS_e = 0.08$		
	163	St. Clair		
		Head Start-Present vs. Non-Head Start	0.08	0.06
		Head Start-Present vs. Head Start-Absent	0.08	0.06
		Head Start-Absent vs. Non-Head Start	0.02	0.06
		Constant	0.49	
		Statistics $F = 1.65$ $R^2 = 0.08$ $MS_e = 0.07$		
	144	Maricopa		
		Head Start-Present vs. Non-Head Start	-0.20	0.12
		Head Start-Present vs. Head Start-Absent	-0.02	0.08
		Head Start-Absent vs. Non-Head Start	-0.02	0.08
		Constant	1.20	
		Statistics $F = 1.08$ $R^2 = 0.05$ $MS_e = 0.12$		
	200	Mingo		
		Head Start-Present vs. Non-Head Start	-0.22 *	0.10
		Head Start-Present vs. Head Start-Absent	-0.04	0.06
		Head Start-Absent vs. Non-Head Start	-0.04	0.06
		Constant	0.63	
		Statistics $F = 1.63$ $R^2 = 0.06$ $MS_e = 0.10$		

[a] Significance shown as:

*$p \leq .05$

**$p \leq .01$

***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE$_b$
Vitamin B_{12}	181	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	0.18 ***	0.04
		Head Start-Present vs. Head Start-Absent	0.40 ***	0.10
		Head Start-Absent vs. Non-Head Start	0.22 *	0.10
		Constant	0.22	
		Statistics F = 5.43 R^2 = 0.20	MS_e = 0.07	
	162	St. Clair		
		Head Start-Present vs. Non-Head Start	0.14 **	0.04
		Head Start-Present vs. Head Start-Absent	0.02	0.06
		Head Start-Absent vs. Non-Head Start	-0.12	0.06
		Constant	0.34	
		Statistics F = 3.88 R^2 = 0.17	MS_e = 0.05	
	143	Maricopa		
		Head Start-Present vs. Non-Head Start	0.06	0.06
		Head Start-Present vs. Head Start-Absent	0.06	0.06
		Head Start-Absent vs. Non-Head Start	-0.24 *	0.10
		Constant	0.75	
		Statistics F = 1.81 R^2 = 0.09	MS_e = 0.07	
	203	Mingo		
		Head Start-Present vs. Non-Head Start	0.20 ***	0.04
		Head Start-Present vs. Head Start-Absent	0.10	0.06
		Head Start-Absent vs. Non-Head Start	-0.08	0.06
		Constant	0.41	
		Statistics F = 3.27 R^2 = 0.12	MS_e = 0.07	

[a] Significance shown as:
*$p < .05$
**$p \leq .01$
***$p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Vitamin C	198	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	-10.24	8.14
		Head Start-Present vs. Head Start-Absent	-9.66	17.60
		Head Start-Absent vs. Non-Head Start	0.22	16.48
		Constant	53.08	
		Statistics $F = 1.12$ $R^2 = 0.05$	$MS_e = 2742.38$	
	168	St. Clair		
		Head Start-Present vs. Non-Head Start	15.88	10.68
		Head Start-Present vs. Head Start-Absent	-2.02	12.94
		Head Start-Absent vs. Non-Head Star t	-17.90	12.76
		Constant	110.81	
		Statistics $F = 1.32$ $R^2 = 0.06$	$MS_e = 3208.36$	
	141	Maricopa		
		Head Start-Present vs. Non-Head Start	5.70	9.40
		Head Start-Present vs. Head Start-Absent	-2.26	9.86
		Head Start-Absent vs. Non-Head Start	-7.96	10.28
		Constant	99.05	
		Statistics $F = 0.74$ $R^2 = 0.04$	$MS_e = 2129.33$	
	197	Mingo		
		Head Start-Present vs. Non-Head Start	8.80	7.64
		Head Start-Present vs. Head Start-Absent	-4.58	9.52
		Head Start-Absent vs. Non-Head Start	-13.38	9.06
		Constant	71.68	
		Statistics $F = 1.19$ $R^2 = 0.05$	$MS_e = 2031.47$	

[a] Significance shown as:
$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-35 (continued)

Regression Analyses[a] of Nutrient Density for Posttested Head Start and Non-Head Start Children (Samples A, B, C) within Site

Dependent Variable	Sample Size	Factors[b]	Effects[c] b	SE_b
Cholesterol	191	Greene & Humphreys		
		Head Start-Present vs. Non-Head Start	21.60	16.40
		Head Start-Present vs. Head Start-Absent	24.56	37.00
		Head Start-Absent vs. Non-Head Start	-28.14	20.92
		Constant	265.67	
	Statistics	$F = 0.64$ $R^2 = 0.03$	$MS_e = 1097.73$	
	166	St. Clair		
		Head Start-Present vs. Non-Head Start	13.08	19.70
		Head Start-Present vs. Head Start-Absent	-4.60	23.82
		Head Start-Absent vs. Non-Head Start	-17.64	23.48
		Constant	277.76	
	Statistics	$F = 0.45$ $R^2 = 0.02$	$MS_e = 10844.99$	
	146	Maricopa		
		Head Start-Present vs. Non-Head Start	-35.52	29.76
		Head Start-Present vs. Head Start-Absent	-47.08	31.24
		Head Start-Absent vs. Non-Head Start	-11.58	32.42
		Constant	-246.92	
	Statistics	$F = 1.36$ $R^2 = 0.74$	$MS_e = 22134.81$	
	205	Mingo		
		Head Start-Present vs. Non-Head Start	-59.52 **	19.86
		Head Start-Present vs. Head Start-Absent	-81.76 ***	24.84
		Head Start-Absent vs. Non-Head Start	-22.24	23.88
		Constant	237.07	
	Statistics	$F = 2.58$ $R^2 = 0.10$	$MS_e = 14219.91$	

[a] Significance shown as:
*p<.05
**p<.01
***p<.001

[b] Adjusted for age, sex, employment status, participation in federal food assistance programs.

[c] Centered without weights.

Table 6-36

Total 24-Hour Nutrient Intake for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
KILOCALORIES												
Sample A	67	1550.42	480.32	37	1875.55	473.00	50	1423.31	477.16	34	1651.43	484.17
Sample B	49	1540.57	435.26	38	1909.88	436.65	10	1495.53	389.96	30	1667.16	425.16
Sample C	91	1624.88	448.04	95	1946.37	546.91	89	1476.34	501.18	145	1669.66	540.35
		F= 0.76	P= 0.467		F= 0.27	P= 0.761		F= 0.22	P= 0.804		F= 0.02	P= 0.983
PROTEIN (GM)												
Sample A	67	60.22	20.78	38	67.14	24.13	52	52.91	21.00	35	63.23	23.96
Sample B	49	60.36	18.99	38	64.36	20.78	9	53.82	13.86	30	60.65	17.30
Sample C	91	59.92	19.62	96	71.14	22.34	87	51.80	20.62	148	58.43	24.80
		F= 0.01	P= 0.991		F= 1.37	P= 0.256		F= 0.07	P= 0.928		F= 0.62	P= 0.541
FAT (GM)												
Sample A	66	62.29	21.38	37	77.89	25.64	51	62.73	29.20	33	67.87	22.67
Sample B	49	61.64	24.42	38	78.55	20.07	10	67.76	22.66	30	69.89	21.14
Sample C	90	64.99	22.93	95	81.38	28.07	89	62.12	24.97	144	66.25	23.38
		F= 0.44	P= 0.643		F= 0.31	P= 0.737		F= 0.21	P= 0.814		F= 0.34	P= 0.713
CARBOHYDRATE (GM)												
Sample A	67	186.88	59.50	37	230.38	70.06	50	168.34	55.27	35	200.42	64.44
Sample B	49	191.64	56.18	38	239.87	69.51	10	161.02	49.95	30	203.07	63.47
Sample C	91	201.04	55.10	95	237.54	76.50	88	177.16	60.55	146	213.72	76.07
		F= 1.27	P= 0.284		F= 0.16	P= 0.838		F= 0.60	P= 0.552		F= 0.63	P= 0.532

Table 6-36 (continued)

Total 24-Hour Nutrient Intake for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
CALCIUM (MG)												
Sample A	68	759.30	321.60	38	781.65	425.91	50	722.05	344.19	36	946.06	437.24
Sample B	49	830.60	372.86	37	709.69	324.72	10	751.12	173.29	29	775.97	315.77
Sample C	92	781.36	313.24	95	939.88	436.84	87	754.48	371.05	148	869.10	432.80
		F= 0.68	P= 0.510		F= 4.90	P= 0.008		F= 0.14	P= 0.872		F= 1.32	P= 0.270
IRON (MG)												
Sample A	63	10.48	4.12	37	12.33	4.28	49	8.76	3.02	34	11.00	4.24
Sample B	46	10.15	4.36	38	13.20	4.31	10	10.74	3.21	30	10.35	3.10
Sample C	88	10.59	3.39	92	11.96	4.20	85	9.41	3.53	145	10.12	4.06
		F= 0.20	P= 0.818		F= 1.14	P= 0.321		F= 1.61	P= 0.203		F= 0.67	P= 0.511
MAGNESIUM (MG)												
Sample A	68	193.83	66.56	38	222.45	85.33	52	157.79	67.81	35	212.52	73.75
Sample B	48	209.32	66.12	38	219.84	92.24	10	161.53	53.80	30	202.92	85.05
Sample C	93	221.57	84.40	95	250.39	96.67	87	179.60	79.26	145	203.40	82.91
		F= 2.65	P= 0.073		F= 2.08	P= 0.128		F= 1.50	P= 0.227		F= 0.18	P= 0.831
PHOSPHORUS (MG)												
Sample A	68	1036.48	409.86	38	1039.73	414.54	52	901.95	373.38	36	1214.68	486.39
Sample B	48	1061.30	336.35	37	1000.32	335.81	10	877.09	241.39	30	1049.60	[illegible]86.27
Sample C	93	1066.90	404.39	95	1201.51	440.63	87	935.93	374.08	147	1083.06	430.89
		F= 0.13	P= 0.883		F= 4.09	P= 0.018		F= 0.24	P= 0.787		F= 1.56	P= 0.212

Table 6-36 (continued)

Total 24-Hour Nutrient Intake for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
LOG VITAMIN A (IU)												
Sample A	65	3.64	0.43	38	3.51	0.36	52	3.39	0.28	33	3.49	0.29
Sample B	49	3.70	0.38	38	3.58	0.38	10	3.60	0.21	29	3.46	0.28
Sample C	93	3.68	0.42	93	3.62	0.36	83	3.43	0.33	146	3.49	0.31
		F= 0.29	P= 0.751		F= 1.42	P= 0.243		F= 2.12	P= 0.124		F= 0.13	P= 0.883
VITAMIN A (IU)												
Sample A	65	7717.53	10450.71	38	4476.09	3874.96	52	3010.58	2212.77	33	3760.22	2651.66
Sample B	49	8020.50	10924.15	38	5439.81	6678.06	10	4476.20	2593.74	29	3499.36	2303.56
Sample C	93	7717.72	8364.00	93	5880.96	5734.89	83	3631.14	3125.14	146	3898.23	2648.58
		F= 0.02	P= 0.982		F= 0.84	P= 0.431		F= 1.49	P= 0.230		F= 0.29	P= 0.745
THIAMIN (MG)												
Sample A	68	1.29	0.55	38	1.43	0.58	50	0.98	0.42	35	1.27	0.57
Sample B	49	1.16	0.51	38	1.54	0.58	10	1.03	0.32	30	1.16	0.39
Sample C	87	1.27	0.48	94	1.47	0.62	84	1.03	0.44	142	1.20	0.48
		F= 1.02	P= 0.362		F= 0.35	P= 0.707		F= 0.21	P= 0.813		F= 0.47	P= 0.628
RIBOFLAVIN (MG)												
Sample A	64	1.82	0.77	38	1.83	0.77	49	1.40	0.56	34	1.87	0.70
Sample B	46	1.75	0.71	38	1.85	0.83	10	1.66	0.33	30	1.63	0.56
Sample C	89	1.80	0.72	93	2.06	0.89	87	1.58	0.70	146	1.74	0.76
		F= 0.12	P= 0.885		F= 1.50	P= 0.226		F= 1.43	P= 0.243		F= 0.86	P= 0.425

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (bsae 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-36 (continued)

Total 24-Hour Nutrient Intake for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
NIACIN (MG)												
Sample A	65	14.85	6.31	37	16.27	6.76	50	10.57	5.03	34	14.32	8.02
Sample B	49	15.08	6.72	38	17.08	6.99	10	13.60	4.96	30	12.88	3.72
Sample C	88	14.20	5.41	95	16.76	6.97	85	11.36	4.95	145	12.89	6.12
	F= 0.41	P= 0.666		F= 0.13	P= 0.877		F= 1.59	P= 0.207		F= 0.66	P= 0.517	
VITAMIN B6 (MG)												
Sample A	65	1.29	0.54	36	1.29	0.64	51	1.09	0.55	35	1.33	0.59
Sample B	47	1.28	0.51	37	1.32	0.62	10	1.31	0.65	30	1.11	0.37
Sample C	88	1.27	0.46	93	1.41	0.63	88	1.14	0.53	144	1.19	0.60
	F= 0.03	P= 0.966		F= 0.64	P= 0.527		F= 0.70	P= 0.499		F= 1.24	P= 0.292	
LOG VIT. B12 (MCG)												
Sample A	59	0.47	0.27	38	0.52	0.21	52	0.47	0.23	34	0.55	0.21
Sample B	45	0.47	0.29	37	0.50	0.24	9	0.59	0.22	30	0.51	0.21
Sample C	86	0.48	0.30	90	0.56	0.25	87	0.45	0.29	146	0.46	0.30
	F= 0.07	P= 0.935		F= 1.06	P= 0.347		F= 1.14	P= 0.323		F= 1.73	P= 0.180	
VITAMIN B12 (MCG)												
Sample A	59	3.52	2.44	38	3.68	1.70	52	3.33	1.71	34	3.93	1.78
Sample B	45	3.62	2.55	37	3.69	2.25	9	4.39	2.18	30	3.58	1.65
Sample C	86	3.93	3.47	90	4.22	2.19	87	3.43	1.88	146	3.46	2.02
	F= 0.36	P= 0.697		F= 1.34	P= 0.265		F= 1.19	P= 0.306		F= 0.79	P= 0.453	

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-36 (continued)

Total 24-Hour Nutrient Intake for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
VITAMIN C (MG)												
Sample A	68	128.51	92.52	37	186.67	107.75	50	89.61	65.95	36	89.82	73.11
Sample B	48	115.14	81.75	38	166.91	112.60	10	72.53	62.22	29	77.29	65.54
Sample C	92	123.98	85.26	96	165.17	103.47	86	81.81	58.71	140	98.41	69.29
	F= 0.36	P= 0.695		F= 0.57	P= 0.568		F= 0.44	P= 0.647		F= 1.18	P= 0.308	
CHOLESTEROL (MG)												
Sample A	63	320.54	174.88	38	366.79	189.47	52	335.59	219.85	35	328.53	212.18
Sample B	49	310.94	163.20	38	363.36	238.66	10	268.71	150.44	30	343.20	202.24
Sample C	90	300.58	186.09	93	420.42	222.39	88	316.42	220.35	148	327.98	206.76
	F= 0.24	P= 0.789		F= 1.31	P= 0.272		F= 0.43	P= 0.653		F= 0.07	P= 0.933	

Table 6-37

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups across Sites

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	80	1379.	1526.	1925.	1655.	397.	225	1435.	1755.	2213.	1819.	529.	-2.90	0.004
PROTEIN (GM)	81	52.19	61.69	71.70	63.96	17.80	226	51.45	66.01	83.57	68.81	22.50	-1.96	0.052
FAT (GM)	80	49.11	59.93	77.38	63.82	18.10	222	54.69	68.11	88.91	73.96	24.40	-3.35	0.001
CARBOHYDRATE (GM)	81	172.60	201.23	247.46	214.87	60.60	228	176.03	214.24	270.69	226.40	69.90	-1.41	0.160
CALCIUM (MG)	81	768.	944.	1161.	994.	331.	226	745.	980.	1239.	1023.	375.	-0.65	0.515
IRON (MG)	80	8.27	10.00	12.19	10.63	3.58	224	8.39	10.94	14.04	11.50	4.02	-1.81	0.073
MAGNESIUM (MG)	81	180.96	216.75	268.57	230.50	64.80	226	184.03	235.13	293.97	246.15	86.60	-1.70	0.091
PHOSPHORUS (MG)	81	989.	1101.	1289.	1163.	319.	228	920.	1211.	1507.	1247.	420.	-1.85	0.065
LOG VITAMIN A (IU)	81	3.42	3.73	3.99	3.75	0.42	228	3.45	3.65	3.92	3.68	0.34	1.44	0.151
VITAMIN A (IU)	81	2617.	5377.	9886.	9363.	11053.	228	2802.	4430.	8359.	6635.	6790.	2.09	0.039
THIAMIN (MG)	81	0.86	1.19	1.43	1.22	0.45	225	0.96	1.24	1.69	1.36	0.52	-2.28	0.024
RIBOFAVIN (MG)	79	1.58	1.92	2.60	2.12	0.74	222	1.50	1.97	2.46	2.06	0.76	0.63	0.529
NIACIN (MG)	81	10.65	13.99	16.87	14.53	5.52	224	9.85	13.39	18.52	14.78	6.16	-0.35	0.730
VITAMIN B6 (MG)	78	1.03	1.20	1.50	1.27	0.40	224	0.96	1.25	1.71	1.38	0.56	-1.79	0.075
LOG VIT. B12 (MCG)	70	0.48	0.56	0.69	0.58	0.19	218	0.46	0.61	0.72	0.58	0.24	-0.02	0.984
VITAMIN B12 (MCG)	70	3.00	3.52	4.93	4.27	2.34	218	2.90	4.12	5.22	4.44	2.66	-0.51	0.611
VITAMIN C (MG)	80	67.30	119.92	179.16	131.37	81.30	222	62.39	111.99	181.29	128.23	81.70	0.30	0.768
CHOLESTEROL (MG)	81	200.21	287.12	427.12	332.28	173.00	225	185.01	293.65	458.59	346.81	201.00	-0.62	0.535

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-38

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups across Sites

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	126	1234.	1502.	1791.	1568.	518.	183	1241.	1597.	1930.	1595.	490.	-0.46	0.649
PROTEIN (GM)	128	37.72	51.92	69.21	55.66	21.50	185	38.67	54.09	69.34	55.61	22.20	0.02	0.985
FAT (GM)	126	38.96	64.96	81.67	66.55	25.40	184	47.23	67.26	82.68	67.25	26.20	-0.23	0.816
CARBOHYDRATE (GM)	125	135.84	175.76	227.57	187.72	69.00	181	153.19	191.60	235.20	194.80	64.90	-0.90	0.367
CALCIUM (MG)	126	432.	58[illegible].	787.	628.	294.	182	424.	687.	931.	717.	375.	-2.34	0.020
IRON (MG)	126	7.06	9.25	11.99	10.02	4.29	176	7.54	9.91	12.71	10.29	3.90	-0.55	0.584
MAGNESIUM (MG)	126	132.93	169.90	211.10	180.34	68.60	183	125.30	176.31	236.69	188.25	84.90	-0.91	0.366
PHOSPHORUS (MG)	127	668.	888.	1124.	929.	356.	183	654.	902.	1222.	960.	407.	-0.71	0.477
LOG VITAMIN A (IU)	122	3.21	3.40	3.58	3.42	0.33	178	3.26	3.44	3.61	3.45	0.32	-0.81	0.420
VITAMIN A (IU)	122	1620.	2487.	3844.	3684.	4608.	178	1836.	2732.	4074.	3751.	3775.	-0.13	0.896
THIAMIN (MG)	126	0.76	1.09	1.48	1.19	0.54	176	0.79	1.12	1.48	1.18	0.53	0.23	0.820
RIBOFAVIN (MG)	125	1.04	1.38	1.81	1.45	0.61	180	1.03	1.52	2.03	1.61	0.73	-2.02	0.045
NIACIN (MG)	128	9.07	12.22	17.71	13.77	6.57	180	8.55	12.67	17.12	13.60	6.54	0.23	0.821
VITAMIN B6 (MG)	125	0.68	1.06	1.44	1.09	0.50	181	0.71	1.18	1.62	1.22	0.60	-2.00	0.046
LOG VIT. B12 (MCG)	123	0.25	0.41	0.53	0.38	0.27	182	0.29	0.47	0.63	0.44	0.27	-2.60	0.010
VITAMIN B12 (MCG)	123	1.79	2.55	3.39	2.71	1.58	182	1.94	2.95	4.25	3.28	1.87	-2.90	0.004
VITAMIN C (MG)	126	30.78	82.29	168.36	112.01	93.60	182	36.08	82.90	146.71	106.77	90.10	0.49	0.625
CHOLESTEROL (MG)	124	147.60	264.90	492.55	336.01	218.00	184	140.31	271.07	467.22	323.10	217.00	0.51	0.610

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-39

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups across Sites

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	19	1214.	1514.	1920.	1638.	516.	102	1148.	1485.	1873.	1546.	534.	0.71	0.483
PROTEIN (GM)	19	42.30	54.68	71.29	56.65	21.10	101	40.06	50.28	65.28	54.18	21.10	0.47	0.645
FAT (GM)	18	47.37	59.44	75.22	69.53	30.00	102	43.74	58.20	86.34	65.08	27.30	0.59	0.562
CARBOHYDRATE (GM)	19	151.88	174.98	221.60	186.85	55.00	102	144.00	173.84	231.50	186.30	70.90	0.18	0.861
CALCIUM (MG)	19	437.	590.	973.	729.	377.	103	446.	619.	800.	656.	301.	0.79	0.436
IRON (MG)	17	7.73	9.00	9.41	9.36	3.45	96	7.16	9.27	11.88	10.08	4.01	-0.77	0.446
MAGNESIUM (MG)	19	139.53	164.53	211.74	182.25	70.80	102	109.06	166.41	221.07	174.47	74.50	0.44	0.666
PHOSPHORUS (MG)	19	733.	911.	1159.	982.	411.	103	656.	834.	1120.	903.	350.	0.79	0.439
LOG VITAMIN A (IU)	19	3.22	3.37	3.68	3.42	0.36	101	3.24	3.42	3.73	3.45	0.33	-0.36	0.720
VITAMIN A (IU)	19	1652.	2360.	4770.	3538.	2692.	101	1757.	2657.	5325.	3743.	3076.	-0.30	0.767
THIAMIN (MG)	18	0.86	1.11	1.31	1.09	0.38	99	0.79	1.10	1.52	1.22	0.58	-1.17	0.252
RIBOFAVIN (MG)	18	1.16	1.57	1.72	1.46	0.48	100	1.12	1.39	2.00	1.56	0.68	-0.79	0.437
NIACIN (MG)	18	8.92	11.67	15.79	12.82	6.02	95	8.37	10.94	16.87	13.24	6.84	-0.26	0.794
VITAMIN B6 (MG)	18	0.55	0.89	1.23	1.02	0.61	98	0.68	1.10	1.61	1.21	0.82	-1.22	0.229
LOG VIT. B12 (MCG)	19	0.32	0.48	0.62	0.47	0.29	101	0.35	0.48	0.61	0.47	0.27	-0.07	0.942
VITAMIN B12 (MCG)	19	2.09	3.05	4.18	3.57	2.52	101	2.24	3.01	4.09	3.55	2.18	0.03	0.978
VITAMIN C (MG)	19	69.62	87.20	148.35	114.85	77.00	101	39.75	90.04	173.65	114.51	95.30	0.03	0.987
CHOLESTEROL (MG)	19	210.87	365.41	439.17	343.78	173.00	102	160.20	335.78	491.25	348.74	218.00	-0.07	0.948

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-40

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	38	1317.	1456.	1681.	1503.	286.	71	1380.	1602.	1918.	1679.	456.	-2.47	0.015
St.Clair	24	1486.	1780.	2220.	1838.	486.	47	1773.	2086.	2583.	2180.	502.	-2.77	0.008
Maricopa	0						58	1274.	1490.	1844.	1555.	429.		
Mingo	18	1446.	1673.	2036.	1731.	360.	49	1621.	1975.	2376	1990.	522.	-2.29	0.027
PROTEIN (GM)														
Greene/Humphreys	38	49.62	61.05	69.02	60.36	14.40	70	50.91	62.34	79.26	65.07	18.30	-1.48	0.143
St.Clair	24	54.79	65.17	87.35	69.40	19.60	48	61.24	75.51	97.68	78.88	23.20	-1.82	0.075
Maricopa	0						56	45.34	56.31	67.93	57.52	19.00		
Mingo	19	46.86	61.16	72.73	64.30	30.70	52	63.51	77.67	90.89	76.72	23.90	-2.15	0.038
FAT (GM)														
Greene/Humphreys	38	48.73	58.08	65.59	58.47	15.10	69	50.86	63.62	80.67	65.91	21.80	-2.07	0.041
St.Clair	24	49.72	66.40	88.79	70.12	21.70	47	65.49	80.84	109.63	87.53	27.80	-2.90	0.005
Maricopa	0						58	51.44	63.28	80.51	66.10	23.00		
Mingo	18	54.07	63.18	81.01	66.72	16.30	48	64.49	76.80	90.62	75.26	19.40	-1.79	0.081
CARBOHYDRATE (GM)														
Greene/Humphreys	38	162.77	189.47	215.49	190.12	40.00	72	169.63	203.77	235.78	207.26	50.80	-1.94	0.056
St.Clair	24	181.62	224.68	307.28	238.39	70.50	47	219.16	280.66	331.79	274.85	67.10	-2.21	0.032
Maricopa	0						58	160.92	182.08	213.95	182.49	49.70		
Mingo	19	185.55	235.99	265.05	234.67	65.20	51	189.77	255.79	314.77	256.87	73.90	-1.22	0.230

Table 6-40 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						4-5 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	38	788.	908.	1032.	932.	217.	72	783.	950.	1175.	968.	296.	-0.92	0.360
St.Clair	24	777.	1040.	1253.	1042.	398.	47	839.	1022.	1382.	1131.	438.	-0.87	0.390
Maricopa	0						56	623.	860.	1105.	863.	232.		
Mingo	19	808.	994.	1308.	1078.	408.	51	913.	1173.	1439.	1176.	387.	-0.93	0.361
IRON (MG)														
Greene/Humphreys	38	8.23	9.90	12.16	10.41	3.71	70	8.28	9.93	13.10	10.85	3.90	-0.71	0.480
St.Clair	23	8.20	10.86	14.29	11.35	4.18	47	11.03	12.93	15.78	13.63	3.78	-2.21	0.033
Maricopa	0						55	7.11	9.63	11.07	9.43	3.07		
Mingo	19	9.01	9.68	11.10	10.20	2.36	52	9.56	12.71	15.02	12.53	4.14	-2.94	0.005
MAGNESIUM (MG)														
Greene/Humphreys	38	181.42	208.53	236.93	214.34	45.70	72	188.39	223.89	271.15	238.10	75.00	-1.89	0.063
St.Clair	24	179.82	250.17	325.75	253.41	82.70	47	240.14	302.50	374.08	306.53	85.00	-2.63	0.011
Maricopa	0						58	144.58	177.99	230.41	194.98	69.50		
Mingo	19	186.20	220.20	275.32	233.88	66.30	48	207.75	250.27	332.73	261.65	82.90	-1.44	0.157
PHOSPHORUS (MG)														
Greene/Humphreys	38	898.	1061.	1233.	1111.	210.	72	894.	1145.	1414.	1218.	401.	-1.83	0.070
St.Clair	24	968.	1169.	1471.	1224.	388.	47	1098.	1367.	1678.	1387.	405.	-1.65	0.105
Maricopa	0						57	788.	997.	1273.	1034.	345.		
Mingo	19	894.	1179.	1379.	1191.	401.	52	1106.	1417.	1688.	1394.	437.	-1.84	0.075

Table 6-40 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	38	3.46	3.79	4.30	3.85	0.47	70	3.46	3.73	4.05	3.79	0.37	0.75	0.454
St.Clair	24	3.41	3.76	4.00	3.75	0.40	48	3.60	3.80	3.96	3.78	0.32	-0.34	0.734
Maricopa	0						57	3.32	3.52	3.64	3.51	0.28		
Mingo	10	3.39	3.51	3.75	3.56	0.23	53	3.47	3.58	3.84	3.63	0.28	-1.07	0.289
VITAMIN A (IU)														
Greene/Humphreys	38	2903.	6234.	20064.	12503.	13788.	70	2808.	5343.	11281.	9071.	9763.	1.36	0.179
St.Clair	24	2570.	5766.	10046.	8500.	8707.	48	2891.	6338.	9087.	7813.	6361.	0.34	0.733
Maricopa	0						57	2100.	3312.	4376.	3994.	2858.		
Mingo	10	2483.	3235.	5660.	4173.	2248.	53	2828.	3903.	6883.	5191.	3223.	-1.50	0.141
THIAMIN (MG)														
Greene/Humphreys	38	0.83	1.07	1.26	1.12	0.42	71	0.96	1.18	1.62	1.30	0.46	-2.06	0.041
St.Clair	24	0.98	1.31	1.61	1.35	0.52	47	1.11	1.59	2.06	1.66	0.62	-2.17	0.034
Maricopa	0						57	0.81	1.02	1.27	1.11	0.44		
Mingo	10	1.01	1.27	1.48	1.26	0.38	50	1.12	1.42	1.77	1.45	0.46	-1.78	0.082
RIBOFLAVIN (MG)														
Greene/Humphreys	36	1.51	1.96	2.70	2.13	0.72	67	1.50	1.91	2.31	1.96	0.67	1.11	0.258
St.Clair	24	1.63	2.15	2.66	2.24	0.90	48	1.73	2.28	3.15	2.48	0.86	-1.06	0.289
Maricopa	0						55	1.17	1.60	2.11	1.67	0.63		
Mingo	10	1.65	1.88	2.37	1.94	0.50	52	1.76	2.18	2.65	2.19	0.64	-1.68	0.100

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-40 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C)
Present in Head Start on Day of Recall with Unadjusted Comparisons
Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	38	10.82	14.44	16.90	14.50	5.37	68	10.07	13.18	17.53	14.33	5.57	0.15	0.884
St.Clair	24	12.02	14.58	18.05	15.62	6.29	48	13.28	17.70	22.41	18.14	6.39	-1.59	0.113
Maricopa	0						57	8.73	11.12	13.67	11.97	5.04		
Mingo	19	8.71	12.12	15.04	13.21	4.72	51	10.14	14.32	20.94	15.37	6.33	-1.54	0.131
VITAMIN B6 (MG)														
Greene/Humphreys	36	1.09	1.20	1.42	1.18	0,31	70	0.97	1.22	1.56	1.32	0.47	-1.71	0.091
St.Clair	23	1.02	1.20	1.71	1.41	0.51	46	1.17	1.56	1.99	1.65	0.63	-1.70	0.096
Maricopa	0						57	0.81	1.15	1.43	1.19	0.55		
Mingo	19	1.02	1.22	1.53	1.27	0.35	51	1.04	1.27	1.75	1.42	0.54	-1.38	0.173
LOG VIT. B12 (MCG)														
Greene/Humphreys	29	0.46	0.50	0.70	0.58	0.20	65	0.43	0.58	0.67	0.58	0.25	0.00	0.996
St.Clair	22	0.45	0.59	0.76	0.59	0.24	45	0.51	0.67	0.80	0.63	0.24	-0.68	0.501
Maricopa	0						56	0.39	0.54	0.68	0.52	0.24		
Mingo	19	0.49	0.57	0.64	0.57	0.11	52	0.53	0.64	0.73	0.61	0.21	-0.95	0.345
VITAMIN B12 (MCG)														
Greene/Humphreys	29	2.87	3.16	4.96	4.36	2.86	65	2.72	3.81	4.66	4.69	3.82	-0.46	0.643
St.Clair	22	2.81	3.90	5.82	4.50	2.45	45	3.27	4.64	6.29	4.84	2.20	-0.55	0.585
Maricopa	0						56	2.48	3.46	4.85	3.80	1.94		
Mingo	19	3.13	3.74	4.36	3.86	1.02	52	3.42	4.37	5.44	4.46	1.67	-1.83	0.072

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-40 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	37	56.18	81.11	144.88	105.46	71.30	71	58.04	115.24	171.33	124.70	78.50	-1.28	0.205
St.Clair	24	125.72	164.30	246.44	185.25	84.30	47	124.84	190.01	258.59	193.37	85.40	-0.38	0.704
Maricopa	0						57	42.88	69.09	116.71	89.58	60.40		
Mingo	19	74.56	93.03	156.94	113.78	64.80	47	64.34	109.29	155.06	115.31	65.90	-0.09	0.932
CHOLESTEROL (MG)														
Greene/Humphreys	38	200.81	319.68	427.23	338.99	162.00	67	184.60	284.03	407.58	316.83	159.00	0.68	0.500
St.Clair	24	244.05	298.59	558.00	392.04	211.00	47	321.44	435.26	540.56	447:73	213.00	-1.05	0.299
Maricopa	0						58	146.53	220.08	423.64	311.33	227.00		
Mingo	19	174.32	237.56	293.87	243.35	91.90	53	209.79	290.03	449.34	334.05	183.00	-2.77	0.007

Table 6-41

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	41	1246.	1447.	1589.	1482.	455.	47	1307.	1646.	1930.	1608.	530.	-1.20	0.234
St.Clair	32	1365.	1602.	2124	1748.	560.	35	1591.	1751.	2001.	1775.	337.	-0.24	0.812
Maricopa	0						51	1087.	1389.	1817.	1475.	568.		
Mingo	53	1207.	1477.	1708.	1526.	521.	50	1225.	1545.	1805.	1579.	426.	-0.56	0.575
PROTEIN (GM)														
Greene/Humphreys	42	38.32	50.76	68.45	54.68	20.30	48	42.27	59.92	73.00	58.93	23.10	-1.14	0.256
St.Clair	32	48.00	63.35	74.38	61.38	21.20	36	45.35	58.65	69.87	60.55	20.50	0.16	0.870
Maricopa	0						51	35.18	46.34	66.29	51.46	23.10		
Mingo	54	36.47	50.62	67.42	53.02	22.30	50	37.43	50.50	66.73	52.15	20.60	0.21	0.837
FAT (GM)														
Greene/Humphreys	41	48.40	57.71	74.52	61.25	21.60	47	50.10	66.51	85.62	65.74	26.90	-0.87	0.388
St.Clair	32	56.66	73.38	96.75	76.97	27.50	36	65.16	75.10	83.77	75.62	21.00	0.22	0.823
Maricopa	0						51	40.70	61.11	83.58	64.62	30.40		
Mingo	53	48.96	61.89	78.67	64.37	25.50	50	47.82	65.85	76.49	65.32	23.80	-0.20	0.845
CARBOHYDRATE (GM)														
Greene/Humphreys	41	131.95	175.76	226.30	179.45	60.70	46	139.35	188.99	243.47	194.50	71.90	-1.06	0.293
St.Clair	32	157.02	192.25	233.33	205.34	81.80	35	181.58	213.59	246.34	221.26	53.10	-0.93	0.354
Maricopa	0						50	129.04	165.99	221.95	171.58	64.40		
Mingo	52	135.33	168.57	228.45	183.40	66.00	50	165.38	190.98	235.20	199.78	59.30	-1.32	0.190

Table 6-41 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	42	349.	488.	720.	544.	245.	47	466.	672.	871.	682.	326.	-2.27	0.026
St.Clair	32	495.	624.	798.	629.	208.	35	295.	663.	920.	682.	415.	-0.67	0.505
Maricopa	0						50	397.	710.	931.	706.	367.		
Mingo	54	436.	659.	809.	691.	355.	50	439.	715.	1103.	784.	397.	-1.26	0.212
IRON (MG)														
Greene/Humphreys	41	7.25	9.40	11.53	9.60	3.39	41	6.85	10.98	14.48	10.75	4.43	-1.32	0.191
St.Clair	32	8.21	9.85	14.24	11.53	5.16	36	9.61	10.60	14.08	11.66	3.38	-0.13	0.893
Maricopa	0						49	7.19	9.65	11.34	9.51	3.60		
Mingo	53	6.41	8.54	11.76	9.45	4.20	50	7.24	9.21	11.62	9.68	3.84	-0.29	0.771
MAGNESIUM (MG)														
Greene/Humphreys	42	132.27	166.96	204.75	175.78	70.20	47	144.72	196.59	240.13	204.19	89.00	-1.68	0.097
St.Clair	32	119.48	163.09	235.08	176.14	69.70	36	152.56	195.99	228.52	205.56	86.10	-1.56	0.125
Maricopa	0						51	105.77	154.36	218.33	167.27	78.90		
Mingo	54	152.57	173.02	213.20	186.38	67.50	49	114.50	171.56	236.17	182.08	82.00	0.29	0.773
PHOSPHORUS (MG)														
Greene/Humphreys	42	606.	844.	1086.	864.	358.	47	726.	938.	1142.	931.	404.	-1.58	0.119
St.Clair	32	738.	866.	1200.	928.	314.	35	532.	902.	1228.	944.	431.	-0.17	0.865
Maricopa	0						51	629.	848.	1169.	906.	393.		
Mingo	53	739.	942.	1142.	981.	376.	50	638.	923.	1362.	998.	413.	-0.21	0.834

Table 6-41 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	41	3.28	3.45	3.67	3.50	0.39	40	3.36	3.53	3.69	3.57	0.33	-0.88	0.383
St.Clair	30	3.18	3.34	3.49	3.35	0.26	35	3.25	3.45	3.56	3.43	0.35	-1.09	0.281
Maricopa	0						49	3.20	3.41	3.59	3.42	0.29		
Mingo	51	3.18	3.43	3.59	3.38	0.31	46	3.20	3.39	3.61	3.37	0.27	0.39	0.700
VITAMIN A (IU)														
Greene/Humphreys	41	1821.	2844.	4722.	5160.	7238.	48	2428.	3373.	4912.	5141.	5636.	0.01	0.989
St.Clair	30	1524.	2168.	3118.	2704.	2026.	35	1793.	2797.	3634.	3757.	3719.	-1.44	0.155
Maricopa	0						49	1572.	2601.	3850.	3289.	2511.		
Mingo	51	1531.	2679.	3929.	3074.	2087.	46	1584.	2442.	4104.	2775.	1559.	0.80	0.423
THIAMIN (MG)														
Greene/Humphreys	42	0.80	1.18	1.48	1.23	0.56	43	0.80	1.30	1.68	1.31	0.64	-0.64	0.523
St.Clair	32	0.84	1.33	1.78	1.36	0.62	36	1.08	1.30	1.73	1.39	0.53	-0.21	0.835
Maricopa	0						48	0.63	0.92	1.32	0.97	0.42		
Mingo	52	0.74	0.97	1.29	1.06	0.44	49	0.79	1.07	1.40	1.11	0.44	-0.56	0.576
RIBOFLAVIN (MG)														
Greene/Humphreys	42	1.00	1.34	1.68	1.43	0.62	45	1.19	1.67	2.16	1.72	0.78	-1.95	0.055
St.Clair	30	1.04	1.35	1.73	1.42	0.48	35	1.09	1.53	2.07	1.62	0.69	-1.36	0.178
Maricopa	0						51	0.96	1.31	1.95	1.51	0.70		
Mingo	53	1.05	1.41	1.86	1.49	0.67	49	1.04	1.46	1.98	1.60	0.74	-0.80	0.427

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-41 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	42	10.39	12.93	17.44	14.00	5.26	45	9.27	15.01	22.13	16.17	7.89	-1.52	0.133
St.Clair	32	9.39	13.72	20.27	15.38	8.00	36	12.14	14.88	17.34	15.77	5.14	-0.24	0.814
Maricopa	0						49	7.69	10.27	13.93	11.16	5.00		
Mingo	54	7.93	10.59	17.40	12.64	6.46	50	7.36	11.42	15.39	12.11	6.29	0.42	0.672
VITAMIN B6 (MG)														
Greene/Humphreys	40	0.76	1.17	1.43	1.16	0.51	44	0.97	1.39	1.85	1.40	0.56	-2.03	0.046
St.Clair	32	0.68	0.86	1.42	1.08	0.47	36	0.75	1.15	1.56	1.23	0.60	-1.22	0.226
Maricopa	0						51	0.74	1.13	1.46	1.14	0.55		
Mingo	53	0.67	1.01	1.45	1.06	0.52	50	0.61	0.93	1.52	1.13	0.64	-0.66	0.513
LOG VIT. B12 (MCG)														
Greene/Humphreys	41	0.09	0.38	0.45	0.30	0.27	46	0.28	0.46	0.63	0.47	0.27	-2.98	0.004
St.Clair	30	0.32	0.43	0.57	0.42	0.18	36	0.35	0.47	0.61	0.46	0.24	-0.84	0.402
Maricopa	0						52	0.29	0.46	0.65	0.43	0.31		
Mingo	52	0.27	0.40	0.55	0.37	0.31	48	0.23	0.43	0.60	0.41	0.26	-0.59	0.557
VITAMIN B12 (MCG)														
Greene/Humphreys	41	1.24	2.23	2.84	2.36	1.40	46	1.93	3.00	4.27	3.55	2.24	-3.01	0.004
St.Clair	30	2.10	2.69	3.69	2.81	0.96	36	2.25	2.97	4.05	3.30	1.64	-1.50	0.138
Maricopa	0						52	1.95	3.01	4.51	3.33	1.97		
Mingo	52	1.85	2.54	3.57	2.92	1.94	48	1.70	2.68	4.00	2.96	1.49	-0.10	0.917

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-41 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						4-5 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	42	53.69	116.10	178.82	121.79	77.50	48	48.07	123.17	184.90	138.03	101.00	-0.86	0.393
St.Clair	33	36.30	127.29	227.78	145.67	123.00	36	46.87	121.20	196.84	143.98	120.00	0.06	0.955
Maricopa	0						50	36.08	67.89	118.25	78.89	52.20		
Mingo	52	24.65	64.14	109.34	83.38	76.10	48	31.75	63.40	98.00	76.65	60.80	0.49	0.625
CHOLESTEROL (MG)														
Greene/Humphreys	41	143.21	210.88	312.85	273.18	177.00	47	152.24	265.74	437.01	314.34	201.00	-1.02	0.309
St.Clair	30	175.93	426.11	644.33	396.54	235.00	36	195.06	242.10	481.76	323.13	215.00	1.31	0.194
Maricopa	0						52	119.05	310.34	507.96	332.56	223.00		
Mingo	53	149.42	268.23	502.02	380.38	228.00	48	139.70	286.15	441.56	321.44	232.00	0.63	0.528

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Table 6-42

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	1	-----	1096.	-----	1096.	-----	9	1086.	1299.	1946.	1499.	535.	-2.26	0.053
St.Clair	8	1569.	1983.	2401.	1973.	518.	24	1542.	1940.	2359.	1937.	504.	0.17	0.869
Maricopa	0						40	1010.	1301.	1526.	1204.	412.		
Mingo	10	1062.	1482.	1767.	1425.	375.	29	1166.	1651	1824.	1571.	535.	-0.95	0.354
PROTEIN (GM)														
Greene/Humphreys	1	-----	50.12	-----	50.12	-----	8	28.55	44.00	58.68	46.59	21.50	0.46	0.657
St.Clair	8	52.78	73.47	88.93	69.66	23.20	24	55.25	64.82	82.78	69.71	21.50	-0.01	0.996
Maricopa	0						41	39.82	44.93	54.38	46.26	16.80		
Mingo	10	36.81	45.56	54.88	46.89	14.60	28	39.26	54.08	66.10	54.63	19.80	-1.30	0.207
FAT (GM)														
Greene/Humphreys	1	-----	45.57	-----	45.57	-----	9	38.78	51.91	93.27	62.71	36.80	-1.40	0.200
St.Clair	7	62.29	75.22	115.46	86.94	32.20	24	65.25	78.42	105.08	83.80	25.40	0.24	0.818
Maricopa	0						41	37.06	50.67	74.27	55.51	24.00		
Mingo	10	44.31	57.38	68.92	59.75	24.50	28	47.58	59.27	78.68	63.84	22.90	-0.46	0.651
CARBOHYDRATE (GM)														
Greene/Humphreys	1	-----	120.16	-----	120.16	-----	9	157.61	159.84	212.69	181.55	43.40	-4.24	0.003
St.Clair	8	168.13	205.00	247.02	210.77	49.20	24	162.70	224.83	281.00	227.97	78.90	-0.73	0.477
Maricopa	0						40	109.03	161.92	200.35	161.35	60.10		
Mingo	10	129.69	172.32	220.90	178.19	55.50	29	145.51	182.90	235.76	187.72	71.20	-0.43	0.669

Table 6-42 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

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	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	1	-----	343.	-----	343.	-----	9	332.	422.	583.	474.	175.	-2.24	0.056
St.Clair	8	538.	807.	1224.	857.	411.	24	498.	654.	789.	677.	280.	1.15	0.279
Maricopa	0						41	445.	599.	777.	626.	309.		
Mingo	10	401.	570.	816	665.	343.	29	500.	750.	884.	739.	318.	-0.60	0.560
IRON (MG)														
Greene/Humphreys	1	-----	9.00	-----	9.00	-----	8	7.17	8.58	9.21	9.19	3.41	-0.16	0.881
St.Clair	7	7.82	11.33	14.50	11.50	4.26	22	10.08	12.85	16.48	13.10	4.67	-0.84	0.417
Maricopa	0						40	6.43	8.51	11.10	8.81	3.47		
Mingo	9	5.67	8.36	9.28	7.73	1.80	26	7.77	9.29	10.11	9.76	3.13	-2.36	0.026
MAGNESIUM (MG)														
Greene/Humphreys	1	-----	119.60	-----	119.60	-----	9	98.03	192.81	227.58	176.68	74.10	-2.31	0.050
St.Clair	8	158.02	189.06	255.44	208.13	71.00	24	166.25	214.47	273.91	220.92	81.00	-0.39	0.701
Maricopa	0						40	105.15	135.21	176.94	145.14	64.40		
Mingo	10	125.54	159.73	184.74	167.00	69.00	29	121.23	169.28	213.68	175.79	64.80	-0.35	0.729
PHOSPHORUS (MG)														
Greene/Humphreys	1	-----	605.	-----	605.	-----	9	519.	752.	941.	810.	409.	-1.51	0.170
St.Clair	8	969.	1159.	1316.	1190.	473.	24	732.	1055.	1167.	995.	285.	1.10	0.299
Maricopa	0						41	612.	756.	912.	803.	317.		
Mingo	10	715.	844.	1060.	853.	303.	29	753.	965.	1219.	996.	393.	-1.18	0.251

Table 6-42 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						5-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	1	-----	3.37	-----	3.37	-----	9	3.29	3.39	3.73	3.46	0.43	-0.60	0.565
St.Clair	8	3.18	3.40	3.73	3.41	0.38	24	3.37	3.64	3.79	3.56	0.28	-1.07	0.311
Maricopa	0						39	3.11	3.27	3.44	3.32	0.33		
Mingo	10	3.21	3.43	3.67	3.43	0.39	29	3.30	3.48	3.76	3.53	0.27	-0.74	0.471
VITAMIN A (IU)														
Greene/Humphreys	1	-----	2360.	-----	2360.	-----	9	1942.	1961.	5432.	4621.	5680.	-1.19	0.267
St.Clair	8	1541.	2527.	5384.	3425.	2561.	24	2364.	4365.	6197.	4362.	2334.	-0.92	0.379
Maricopa	0						39	1301.	1869.	2757.	2906.	3013.		
Mingo	10	1613.	2773.	4712.	3745.	3029.	29	1997.	3073.	5696.	4083.	2472.	-0.32	0.756
THIAMIN (MG)														
Greene/Humphreys	1	-----	1.28	-----	1.28	-----	9	1.00	1.23	1.49	1.28	0.30	-0.02	0.981
St.Clair	8	1.11	1.22	1.43	1.22	0.38	23	1.22	1.65	2.07	1.62	0.68	-2.09	0.049
Maricopa	0						39	0.61	0.85	1.16	0.93	0.40		
Mingo	9	0.69	0.87	1.10	0.96	0.38	28	0.90	1.11	1.50	1.26	0.57	-1.79	0.087
RIBOFLAVIN (MG)														
Greene/Humphreys	1	-----	1.55	-----	1.55	-----	8	0.95	1.10	1.32	1.18	0.37	2.80	0.026
St.Clair	8	1.45	1.62	1.79	1.62	0.49	24	1.25	1.88	2.40	1.92	0.80	-1.27	0.219
Maricopa	0						40	0.92	1.27	1.58	1.35	0.55		
Mingo	9	1.00	1.35	1.63	1.31	0.48	28	1.26	1.54	2.03	1.66	0.66	-1.77	0.093

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-42 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	1	-----	15.79	-----	15.79	-----	8	9.61	10.41	14.77	12.03	3.39	3.13	0.017
St.Clair	8	9.05	12.98	19.27	14.85	7.23	22	14.10	17.04	23.90	19.05	8.62	-1.33	0.202
Maricopa	0						39	5.97	9.64	13.45	10.28	4.80		
Mingo	9	7.17	11.38	13.02	10.69	4.57	26	8.36	11.85	17.03	13.14	5.91	-1.28	0.217
VITAMIN B6 (MG)														
Greene/Humphreys	1	-----	1.48	-----	1.48	-----	9	0.73	1.25	1.58	1.27	0.60	1.09	0.306
St.Clair	8	0.61	0.86	1.32	0.97	0.51	21	0.90	1.30	1.81	1.48	0.75	-2.07	0.052
Maricopa	0						41	0.60	0.89	1.34	1.06	0.55		
Mingo	9	0.55	0.89	1.12	1.00	0.74	27	0.81	1.10	1.48	1.22	0.59	-0.79	0.446
LOG VIT. B12 (MCG)														
Greene/Humphreys	1	-----	0.22	-----	0.22	-----	8	-0.12	0.16	0.49	0.15	0.32	0.27	0.796
St.Clair	8	0.45	0.56	0.68	0.53	0.20	24	0.45	0.54	0.79	0.59	0.23	-0.69	0.500
Maricopa	0						40	0.30	0.46	0.56	0.44	0.24		
Mingo	10	0.29	0.45	0.56	0.44	0.35	28	0.44	0.49	0.61	0.51	0.20	-0.52	0.612
VITAMIN B12 (MCG)														
Greene/Humphreys	1	-----	1.68	-----	1.68	-----	8	0.76	1.45	2.24	1.89	1.47	-0.59	0.571
St.Clair	8	2.83	3.68	4.78	3.87	1.38	24	2.84	3.51	6.15	4.48	2.99	-1.12	0.275
Maricopa	0						40	1.98	2.87	3.62	3.13	1.72		
Mingo	10	1.96	2.85	3.60	3.68	3.28	29	2.74	3.09	4.64	3.80	2.26	-0.11	0.915

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-42 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Age Groups within Site

	3-4 YEAR OLDS						5-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	1	-----	28.36	-----	28.36	-----	9	108.39	129.48	166.10	127.38	79.50	-3.74	0.006
St.Clair	8	90.45	121.44	219.54	151.26	77.90	24	106.66	169.52	290.21	186.20	117.00	-1.01	0.325
Maricopa	0						39	25.00	45.72	137.36	81.81	73.10		
Mingo	10	57.28	85.26	133.51	94.37	68.30	29	39.75	86.64	114.81	93.51	73.50	0.03	0.974
CHOLESTEROL (MG)														
Greene/Humphreys	1	-----	380.38	-----	380.38	-----	8	102.30	181.83	330.46	281.08	241.00	1.63	0.146
St.Clair	8	303.75	438.17	521.52	422.36	184.00	24	186.75	331.98	545.31	385.20	244.00	0.33	0.745
Maricopa	0						41	147.58	327.68	408.98	315.83	183.00		
Mingo	10	158.59	315.18	385.61	276.26	151.00	29	167.29	388.85	527.97	376.73	220.00	-1.60	0.124

Table 6-43

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females across Sites

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	151	1478.	1807.	2288.	1874.	512.	154	1374.	1584.	1968.	1680.	475.	3.42	0.001
PROTEIN (GM)	154	55.74	68.28	86.08	70.86	22.90	153	49.50	62.86	73.20	64.18	19.70	2.77	0.006
FAT (GM)	150	58.46	70.76	81.30	75.10	23.60	152	49.84	62.08	79.30	65.45	22.00	3.68	0.000
CARBOHYDRATE (GM)	153	182.89	225.83	285.20	234.44	70.10	156	169.84	190.40	246.59	212.93	63.40	2.88	0.004
CALCIUM (MG)	151	761.	1005.	1271.	1050.	386.	156	748.	939.	1181.	983.	339.	1.62	0.106
IRON (MG)	150	9.05	11.36	14.29	11.82	4.04	154	7.89	10.15	12.77	10.64	3.73	2.89	0.004
MAGNESIUM (MG)	152	185.57	234.83	324.00	252.06	88.90	155	180.57	224.66	267.88	231.29	74.80	2.34	0.020
PHOSPHORUS (MG)	153	979.	1242.	1553.	1274.	411.	156	914.	1121.	1383.	1177.	378.	2.15	0.033
LOG VITAMIN A (IU)	154	3.45	3.65	3.93	3.69	0.36	155	3.41	3.68	3.93	3.71	0.37	-0.42	0.673
VITAMIN A (IU)	154	2854.	4453.	8528.	7162.	8326.	155	2580.	4780.	8553.	7556.	8084.	-0.44	0.658
THIAMIN (MG)	153	0.97	1.28	1.60	1.40	0.55	153	0.94	1.17	1.52	1.28	0.45	2.50	0.013
RIBOFAVIN (MG)	149	1.53	2.03	2.56	2.12	0.78	152	1.50	1.80	2.43	2.03	0.72	1.07	0.283
NIACIN (MG)	152	10.56	14.27	19.07	15.34	6.36	153	9.67	13.40	17.43	14.09	5.95	1.83	0.068
VITAMIN B6 (MG)	150	1.01	1.27	1.72	1.40	0.54	152	0.97	1.20	1.55	1.30	0.51	1.59	0.114
LOG VIT. B12 (MCG)	146	0.48	0.62	0.73	0.60	0.23	142	0.46	0.57	0.69	0.57	0.22	1.12	0.263
VITAMIN B12 (MCG)	146	3.03	4.15	5.33	4.53	2.45	142	2.87	3.71	4.88	4.29	2.71	0.91	0.364
VITAMIN C (MG)	148	63.10	110.07	182.12	127.42	78.30	154	65.13	117.20	174.23	130.64	84.60	-0.34	0.732
CHOLESTEPOL (MG)	153	189.31	298.74	481.22	348.68	186.00	153	185.01	287.12	433.09	337.25	201.00	0.52	0.607

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-44

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Males and Females across Sites

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	150	1323.	1578.	1895.	1640.	485.	158	1181.	1505.	1800.	1531.	502.	1.93	0.055
PROTEIN (GM)	154	50.73	57.25	69.57	58.08	22.30	158	37.20	51.66	66.44	53.26	21.30	1.96	0.051
FAT (GM)	150	51.11	69.11	84.40	68.04	25.50	160	46.42	65.08	77.48	65.[illegible]	26.20	1.37	0.172
CARBOHYDRATE (GM)	148	149.11	193.33	237.17	196.71	64.40	158	130.54	178.75	227.57	187.41	68.50	1.23	0.221
CALCIUM (MG)	152	408.	637.	850.	670.	353.	158	438.	640.	900.	689.	340.	-0.49	0.628
IRON (MG)	150	7.50	9.81	13.17	10.48	3.85	152	7.05	9.67	12.05	9.86	4.25	1.35	0.177
MAGNESIUM (MG)	153	138.24	168.08	220.55	182.00	76.00	158	132.27	175.78	236.80	187.90	81.20	-0.66	0.508
PHOSPHORUS (MG)	154	672.	898.	1152.	966.	406.	156	636.	899.	1167.	929.	368.	0.84	0.399
LOG VITAMIN A (IU)	150	3.21	3.37	3.56	3.40	0.29	150	3.26	3.47	3.65	3.47	0.34	-1.97	0.050
VITAMIN A (IU)	150	1620.	2358.	3640.	3292.	3577.	150	1801.	2946.	4484.	4156.	4583.	-1.82	0.070
THIAMIN (MG)	151	0.82	1.14	1.50	1.21	0.50	151	0.74	1.08	1.47	1.16	0.57	0.77	0.444
RIBOFAVIN (MG)	151	1.03	1.45	1.88	1.52	0.63	154	1.05	1.43	2.00	1.57	0.74	-0.74	0.457
NIACIN (MG)	152	8.78	13.08	17.41	13.84	6.18	156	8.38	11.94	17.22	13.40	6.85	0.72	0.474
VITAMIN B6 (MG)	151	0.71	1.08	1.52	1.15	0.53	155	0.68	1.18	1.56	1.19	0.60	-0.54	0.593
LOG VIT. B12 (MCG)	152	0.27	0.43	0.56	0.41	0.25	153	0.28	0.43	0.58	0.41	0.30	0.10	0.916
VITAMIN B12 (MCG)	152	1.88	2.68	3.60	2.99	1.84	153	1.88	2.68	3.84	3.11	1.93	-0.60	0.547
VITAMIN C (MG)	151	38.88	86.18	152.55	106.41	80.80	157	43.83	85.66	150.88	111.32	83.30	-0.47	0.638
CHOLESTEROL (MG)	150	152.50	306.31	516.18	345.12	220.00	158	141.15	246.71	443.41	312.32	214.00	1.33	0.185

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-45

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females across Sites

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	66	1115.	1560.	2000.	1618.	552.	55	1165.	1450.	1776.	1492.	499.	1.32	0.188
PROTEIN (GM)	65	41.25	52.18	67.11	56.52	21.00	55	39.55	50.28	62.29	52.26	21.00	1.11	0.271
FAT (GM)	65	47.37	62.82	88.41	69.73	29.00	55	44.24	57.72	75.89	61.06	25.30	1.75	0.083
CARBOHYDRATE (GM)	66	144.00	177.13	235.76	189.22	73.40	55	145.88	168.77	226.27	183.68	62.40	0.45	0.655
CALCIUM (MG)	66	449.	596.	784.	634.	281.	56	429.	668.	917.	707.	346.	-1.27	0.206
IRON (MG)	62	7.84	9.28	12.18	10.31	3.81	51	6.53	9.01	11.19	9.56	4.05	1.02	0.312
MAGNESIUM (MG)	66	109.70	163.06	227.25	173.40	76.90	55	120.41	169.28	212.81	178.44	70.20	-0.38	0.707
PHOSPHORUS (MG)	66	664.	875.	1125.	903.	311.	56	631.	836.	1149.	929.	412.	-0.38	0.704
LOG VITAMIN A (IU)	64	3.22	3.42	3.68	3.42	0.32	56	3.27	3.42	3.76	3.48	0.34	-1.11	0.271
VITAMIN A (IU)	64	1644.	2646.	4764.	3434.	2805.	56	1849.	2642.	5713.	4028.	3119.	-1.07	0.285
THIAMIN (MG)	64	0.90	1.11	1.52	1.22	0.56	53	0.78	1.10	1.35	1.17	0.56	0.45	0.657
RIBOFAVIN (MG)	64	1.15	1.44	1.92	1.57	0.66	54	1.00	1.43	1.88	1.53	0.64	0.31	0.755
NIACIN (MG)	63	8.85	12.26	17.83	14.13	7.08	50	7.96	9.99	15.79	11.98	6.23	1.71	0.089
VITAMIN B6 (MG)	64	0.73	1.08	1.60	1.18	0.61	52	0.66	1.03	1.49	1.18	0.65	0.03	0.976
LOG VIT. B12 (MCG)	64	0.43	0.52	0.64	0.51	0.24	56	0.29	0.44	0.59	0.43	0.31	1.72	0.088
VITAMIN B12 (MCG)	64	2.72	3.31	4.35	3.76	2.09	56	1.95	2.76	3.93	3.32	2.37	1.07	0.287
VITAMIN C (MG)	66	32.26	83.66	173.65	108.31	91.70	54	51.36	96.08	163.48	122.21	93.40	-0.82	0.415
CHOLESTEROL (MG)	65	161.78	359.08	477.03	362.13	219.00	56	153.80	310.63	487.80	327.88	203.00	0.89	0.374

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-46

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	46	1318.	1563.	1856.	1610.	409.	63	1391.	1526.	1867.	1623.	417.	-0.16	0.871
St.Clair	36	1882.	2108.	2577.	2186.	487.	35	1501.	1787.	2323.	1939.	529.	2.04	0.045
Maricopa	32	1385.	1574.	2037	1675.	439.	26	1183.	1441.	1622.	1407.	374.	2.51	0.015
Mingo	37	1621.	2223.	2425.	2070.	474.	30	1396.	1719.	2038.	1735.	463.	2.92	0.005
PROTEIN (GM)														
Greene/Humphreys	46	49.82	60.70	73.49	63.07	17.80	62	50.91	63.20	73.17	63.66	16.60	-0.18	0.861
St.Clair	37	62.55	80.51	96.56	79.71	23.80	35	58.59	66.31	86.13	71.50	20.40	1.58	0.119
Maricopa	31	48.20	59.02	74.59	60.96	19.80	25	44.39	50.41	65.88	53.25	17.30	1.55	0.126
Mingo	40	64.56	78.04	93.26	79.32	22.40	31	50.55	63.49	78.41	65.75	23.20	2.48	0.016
FAT (GM)														
Greene/Humphreys	45	52.45	60.15	72.25	62.93	18.90	62	48.73	58.06	78.09	63.52	20.80	-0.15	0.878
St.Clair	36	67.28	86.04	109.63	88.77	26.20	35	55.39	68.36	88.79	74.33	26.30	2.37	0.023
Maricopa	32	54.58	64.60	90.77	71.72	23.70	26	40.00	61.24	68.16	59.19	20.40	2.16	0.035
Mingo	37	64.66	82.42	91.30	79.54	17.50	29	52.19	67.94	78.12	64.49	17.40	3.48	0.001
CARBOHYDRATE (GM)														
Greene/Humphreys	46	160.76	188.19	235.08	199.42	49.20	64	172.75	198.76	224.26	202.72	47.30	-0.35	0.726
St.Clair	36	224.02	283.10	335.95	274.98	65.30	35	190.99	245.87	312.94	252.40	74.00	1.36	0.178
Maricopa	32	165.23	198.72	232.84	196.87	50.20	26	117.73	173.46	188.62	164.78	43.70	2.60	0.012
Mingo	39	215.56	256.05	333.67	269.15	73.00	31	174.39	235.99	269.39	227.81	64.30	2.52	0.014

Table 6-46 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	U3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	46	773.	932.	1060.	929.	260.	64	815.	933.	1175.	968.	280.	-0.75	0.456
St.Clair	36	810.	1187.	1461.	1142.	453.	35	790.	970.	1223.	1058.	379.	0.85	0.396
Maricopa	30	610.	877.	1099.	879.	365.	26	630.	800.	1111.	844.	297.	0.40	0.691
Mingo	39	1000.	1191.	1530.	1237.	365.	31	805.	994.	1382.	1043.	406.	2.08	0.042
IRON (MG)														
Greene/Humphreys	45	7.96	9.88	12.40	10.74	3.93	63	8.36	9.88	12.72	10.77	3.78	-0.05	0.963
St.Clair	35	10.68	13.40	15.69	13.61	4.02	35	8.74	11.86	14.92	12.14	3.96	1.55	0.127
Maricopa	29	8.32	10.12	12.45	10.19	3.10	26	5.98	8.03	10.63	8.57	2.86	2.02	0.049
Mingo	41	10.00	12.94	15.33	13.00	3.98	30	7.70	10.38	12.88	10.39	3.19	3.06	0.003
MAGNESIUM (MG)														
Greene/Humphreys	46	177.39	210.44	262.27	221.75	58.40	64	188.78	223.50	266.40	233.50	72.50	-0.94	0.350
St.Clair	36	220.47	314.41	386.39	306.96	94.50	35	197.23	264.17	342.44	272.75	77.60	1.65	0.104
Maricopa	32	151.36	203.85	267.90	207.88	77.40	26	138.04	170.38	209.46	178.11	55.70	1.64	0.106
Mingo	38	211.13	281.74	356.00	277.91	82.40	30	182.22	231.99	263.29	223.46	63.10	3.09	0.003
PHOSPHORUS (MG)														
Greene/Humphreys	46	979.	1103.	1331.	1165.	342.	64	1008.	1140.	1344.	1192.	357.	-0.41	0.680
St.Clair	36	1087.	1362.	1714.	1381.	433.	35	967.	1221.	1497.	1281.	370.	1.05	0.296
Maricopa	31	826.	1027.	1401.	1089.	383.	26	786.	952.	1207.	970.	288.	1.33	0.188
Mingo	40	1180.	1463.	1720.	1446.	401.	31	885.	1198.	1429.	1203.	442.	2.39	0.020

Table 6-46 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	45	3.48	3.80	4.09	3.84	0.43	63	3.44	3.73	4.13	3.79	0.40	0.69	0.494
St.Clair	37	3.54	3.79	3.95	3.75	0.30	35	3.53	3.78	3.98	3.80	0.38	-0.60	0.553
Maricopa	31	3.26	3.52	3.61	3.46	0.30	26	3.33	3.53	3.74	3.56	0.27	-1.36	0.179
Mingo	41	3.46	3.60	3.84	3.65	0.26	31	3.42	3.59	3.75	3.57	0.27	1.19	0.239
VITAMIN A (IU)														
Greene/Humphreys	45	2998.	6280.	12187.	11515.	13465.	63	2736.	5336.	13561.	8396.	9698.	0.90	0.370
St.Clair	37	3440.	6204.	8943.	6853.	4072.	35	3422.	6030.	8849.	9298.	9312.	-1.43	0.160
Maricopa	31	1835.	3312.	4066.	3576.	2426.	26	2164.	3387.	5446.	4492.	3279.	-1.18	0.244
Mingo	41	2864.	3875.	6912.	5301.	3301.	31	2654.	3857.	5669.	4421.	2557.	1.27	0.207
THIAMIN (MG)														
Greene/Humphreys	46	0.85	1.08	1.45	1.19	0.45	63	0.97	1.19	1.47	1.27	0.45	-0.89	0.376
St.Clair	37	1.16	1.55	2.20	1.68	0.67	34	1.07	1.28	1.75	1.42	0.49	1.89	0.063
Maricopa	31	0.85	1.15	1.39	1.21	0.47	26	0.80	0.88	1.07	1.00	0.38	1.83	0.073
Mingo	39	1.22	1.43	1.87	1.52	0.45	30	0.94	1.17	1.64	1.25	0.39	2.71	0.009
RIBOFLAVIN (MG)														
Greene/Humphreys	42	1.41	1.80	2.30	1.96	0.69	61	1.52	1.96	2.46	2.06	0.68	-0.72	0.474
St.Clair	37	1.72	2.46	3.07	2.44	0.93	35	1.74	2.27	2.86	2.36	0.83	0.41	0.682
Maricopa	30	1.15	1.70	2.49	1.75	0.75	25	1.30	1.61	1.81	1.57	0.43	1.11	0.271
Mingo	40	1.86	2.22	2.61	2.26	0.99	31	1.55	1.89	2.43	1.95	0.69	2.03	0.047

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-46 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	45	10.65	13.78	16.87	14.43	5.80	61	10.35	14.09	17.80	14.37	5.27	0.05	0.957
St.Clair	37	13.32	17.97	22.16	18.40	6.80	35	12.02	15.18	20.32	16.13	5.88	1.52	0.134
Maricopa	31	9.04	12.61	14.57	12.54	4.85	26	8.30	11.00	13.00	11.29	5.26	0.93	0.359
Mingo	39	10.15	14.51	20.94	15.73	6.52	31	9.73	12.24	17.03	13.59	5.08	1.54	0.127
VITAMIN B6 (MG)														
Greene/Humphreys	45	1.05	1.20	1.44	1.27	0.40	61	0.97	1.20	1.51	1.27	0.45	-0.01	0.988
St.Clair	34	1.05	1.53	1.85	1.58	0.62	35	1.02	1.37	1.99	1.56	0.59	0.14	0.888
Maricopa	31	0.89	1.17	1.54	1.28	0.57	26	0.79	1.04	1.23	1.09	0.50	1.31	0.196
Mingo	40	1.03	1.33	1.85	1.48	0.53	30	1.03	1.22	1.49	1.25	0.41	2.07	0.043
LOG VIT. B12 (MCG)														
Greene/Humphreys	38	0.41	0.55	0.66	0.56	0.22	56	0.45	0.58	0.71	0.60	0.24	-0.97	0.335
St.Clair	36	0.53	0.67	0.82	0.64	0.20	31	0.49	0.60	0.70	0.60	0.16	0.59	0.556
Maricopa	31	0.36	0.57	0.73	0.54	0.26	25	0.42	0.52	0.63	0.49	0.21	0.79	0.434
Mingo	41	0.58	0.64	0.72	0.65	0.12	30	0.38	0.57	0.68	0.53	0.24	2.45	0.019
VITAMIN B12 (MCG)														
Greene/Humphreys	38	2.60	3.54	4.57	4.22	3.15	56	2.83	3.83	5.10	4.84	3.78	-0.86	0.392
St.Clair	36	3.37	4.67	6.59	5.13	2.69	31	3.12	3.98	5.02	4.26	1.56	1.63	0.109
Maricopa	31	2.30	3.74	5.35	4.10	2.30	25	2.65	3.31	4.26	3.42	1.33	1.39	0.169
Mingo	41	3.81	4.35	5.24	4.63	1.30	30	2.40	3.73	4.80	3.86	1.75	2.03	0.047

Note. Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-46 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Present in Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	45	49.28	81.11	152.00	110.97	83.30	63	66.43	120.51	168.20	123.20	72.40	-0.79	0.430
St.Clair	36	128.21	172.96	224.48	180.15	70.70	35	122.24	180.01	281.90	201.30	96.60	-1.06	0.295
Maricopa	31	56.38	69.80	137.73	101.27	65.00	25	42.63	57.18	105.03	75.53	52.30	1.66	0.102
Mingo	36	63.76	110.18	190.55	117.70	67.20	30	71.81	94.89	154.70	111.46	63.40	0.39	0.700
CHOLESTEROL (MG)														
Greene/Humphreys	44	194.63	284.53	442.73	327.20	159.00	61	188.83	288.03	407.17	323.16	161.00	0.13	0.899
St.Clair	36	255.15	410.16	540.00	404.13	186.00	35	275.77	435.26	571.21	454.30	236.00	-0.99	0.324
Maricopa	33	194.26	219.20	577.46	340.88	290.00	26	137.40	222.36	343.90	274.05	184.00	1.13	0.263
Mingo	41	218.74	293.35	449.34	329.12	148.00	31	173.32	216.97	343.17	284.86	181.00	1.07	0.290

Table 6-47

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Males and Females within Site

6A-202

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	48	1278.	1507.	1900.	1607.	520.	40	1233.	1510.	1843.	1480.	495.	1.22	0.227
St.Clair	35	1433.	1712.	1969.	1748.	456.	33	1404.	1683.	2100.	1777.	458.	-0.25	0.801
Maricopa	19	1287.	1466.	1913.	1559.	526.	33	997.	1258.	1949.	1425.	584.	0.84	0.405
Mingo	48	1346.	1574.	1840.	1620.	478.	55	1187.	1464.	1781.	1486.	468.	1.49	0.139
PROTEIN (GM)														
Greene/Humphreys	50	41.87	61.61	74.63	61.07	23.10	40	38.78	52.10	64.63	53.00	19.60	1.78	0.078
St.Clair	35	45.67	59.38	69.08	58.71	22.20	33	47.82	61.85	71.78	62.26	19.10	-0.51	0.613
Maricopa	20	37.30	58.15	67.90	56.17	21.60	31	20.84	42.71	61.89	47.13	23.30	1.73	0.091
Mingo	49	38.47	51.21	67.17	53.84	21.40	55	34.88	50.18	68.79	51.51	21.90	0.55	0.581
FAT (GM)														
Greene/Humphreys	48	49.40	65.24	86.00	66.16	24.40	40	46.94	62.09	73.54	60.63	24.60	1.05	0.295
St.Clair	35	57.38	76.47	93.65	76.65	25.40	33	62.27	71.45	83.19	75.83	23.10	0.14	0.889
Maricopa	19	44.90	73.84	83.58	69.81	30.30	32	40.14	52.01	81.72	61.47	30.50	0.96	0.344
Mingo	48	50.83	66.05	77.95	66.01	24.10	55	45.79	65.28	77.49	63.79	25.20	0.46	0.649
CARBOHYDRATE (GM)														
Greene/Humphreys	47	140.86	178.51	240.38	189.56	67.10	40	135.61	176.80	224.08	181.87	67.40	0.32	0.747
St.Clair	35	176.63	201.44	231.19	206.27	61.40	33	166.24	205.91	260.10	221.74	75.20	-0.92	0.363
Maricopa	19	130.25	171.97	226.20	178.33	62.20	31	132.37	150.68	219.40	167.45	66.30	0.59	0.562
Mingo	47	158.01	192.77	245.05	204.18	64.10	55	135.92	175.83	224.36	180.53	60.60	1.91	0.060

Table 6-47 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	40	384.	603.	780.	618.	300.	40	428.	547.	856.	616.	298.	0.03	0.976
St.Clair	35	347.	632.	845.	625.	353.	32	492.	657.	869.	692.	309.	-0.82	0.417
Maricopa	19	470.	734.	910.	710.	317.	31	382.	628.	956.	703.	400.	0.07	0.945
Mingo	49	414.	673.	851.	739.	408.	55	471.	687.	988.	734.	351.	0.07	0.944
IRON (MG)														
Greene/Humphreys	47	7.31	10.04	14.33	10.63	4.01	35	6.72	9.67	11.80	9.57	3.89	1.21	0.232
St.Clair	35	8.37	9.85	13.99	11.13	3.78	33	9.77	11.08	14.56	12.09	4.75	-0.91	0.364
Maricopa	19	9.58	10.65	13.01	11.16	3.48	30	6.66	8.57	10.93	8.46	3.32	2.69	0.011
Mingo	49	7.23	8.88	11.50	9.65	3.83	54	6.41	8.88	11.88	9.47	4.21	0.23	0.819
MAGNESIUM (MG)														
Greene/Humphreys	50	129.35	168.11	232.89	190.69	86.20	39	146.40	179.31	237.91	190.90	76.20	-0.01	0.990
St.Clair	35	119.48	172.23	216.60	179.06	73.80	33	138.20	189.57	242.56	205.13	84.40	-1.35	0.181
Maricopa	20	113.89	140.17	216.49	168.40	82.60	31	103.87	181.21	218.33	166.55	79.60	0.08	0.937
Mingo	48	139.16	173.02	209.63	180.76	63.90	55	127.83	170.95	235.24	187.46	83.00	-0.46	0.645
PHOSPHORUS (MG)														
Greene/Humphreys	50	671.	871.	1124.	955.	426.	39	642.	904.	1088.	900.	332.	0.68	0.497
St.Clair	35	547.	846.	1188.	893.	413.	32	760.	916.	1278.	984.	334.	-1.00	0.322
Maricopa	20	737.	917.	1236.	977.	373.	31	596.	740.	1135.	860.	404.	1.05	0.300
Mingo	49	745.	946.	1244.	1026.	396.	54	638.	909.	1167.	857.	390.	0.89	0.376

Table 6-47 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children
(Samples A, B, C) with Unadjusted Comparisons
Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	50	3.29	3.44	3.60	3.48	0.31	39	3.37	3.53	3.80	3.61	0.40	-1.71	0.092
St.Clair	34	3.19	3.34	3.52	3.37	0.30	31	3.23	3.42	3.55	3.42	0.32	-0.61	0.545
Maricopa	19	3.15	3.38	3.56	3.39	0.30	30	3.24	3.42	3.61	3.43	0.29	-0.47	0.638
Mingo	47	3.15	3.32	3.51	3.34	0.26	50	3.23	3.50	3.62	3.42	0.31	-1.40	0.166
VITAMIN A (IU)														
Greene/Humphreys	50	1967.	2763.	3963.	4142.	5166.	39	2349.	3429.	6428.	6442.	7548.	-1.63	0.108
St Clair	34	1547.	2168.	3345.	3073.	2993.	31	1707.	2658.	3555.	3488.	3208.	-0.54	0.593
Maricopa	19	1423.	2379.	3631.	3166.	2595.	30	1751.	2654.	4074.	3383.	2497.	-0.29	0.773
Mingo	47	1421.	2085.	3249.	2596.	1625.	50	1701.	3143.	4189.	3249.	2708.	-1.77	0.081
THIAMIN (MG)														
Greene/Humphreys	49	0.85	1.27	1.74	1.34	0.59	36	0.76	1.11	1.46	1.18	0.60	1.23	0.223
St.Clair	35	0.94	1.19	1.45	1.24	0.46	33	1.07	1.38	1.92	1.52	0.64	-2.00	0.050
Maricopa	18	0.70	0.95	1.34	1.07	0.41	30	0.62	0.89	1.24	0.91	0.42	1.28	0.209
Mingo	49	0.80	1.00	1.26	1.10	0.43	52	0.72	0.98	1.42	1.06	0.45	0.39	0.700
RIBOFLAVIN (MG)														
Greene/Humphreys	49	1.14	1.44	1.99	1.57	0.64	38	1.13	1.43	1.93	1.59	0.81	-0.13	0.893
St.Clair	35	0.99	1.49	1.82	1.49	0.62	30	1.15	1.50	1.96	1.57	0.60	-0.53	0.601
Maricopa	19	1.01	1.68	1.85	1.53	0.58	32	0.90	1.25	2.06	1.49	0.77	0.20	0.844
Mingo	48	0.99	1.42	1.77	1.47	0.65	54	1.05	1.51	2.06	1.61	0.75	-1.01	0.314

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-47 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	49	10.54	14.99	19.87	15.87	6.32	38	8.68	12.39	17.75	14.17	7.35	1.14	0.260
St.Clair	35	11.22	13.81	16.92	14.62	5.51	33	11.28	15.50	19.58	16.60	7.53	-1.23	0.223
Maricopa	19	8.78	12.90	16.72	13.01	5.64	30	7.39	9.33	12.65	9.99	4.24	2.01	0.054
Mingo	49	7.35	10.51	15.04	11.88	6.19	55	8.16	11.54	17.71	12.82	6.52	-0.75	0.454
VITAMIN B6 (MG)														
Greene/Humphreys	48	0.91	1.32	1.85	1.35	0.58	36	0.79	1.20	1.53	1.20	0.55	1.25	0.216
St.Clair	35	0.77	0.88	1.52	1.11	0.49	33	0.68	1.25	1.44	1.21	0.59	-0.78	0.439
Maricopa	19	0.78	1.26	1.42	1.15	0.43	32	0.62	1.06	1.59	1.13	0.60	0.13	0.895
Mingo	49	0.61	0.89	1.16	0.98	0.49	54	0.65	1.17	1.68	1.19	0.64	-1.87	0.065
LOG VIT. B12 (MCG)														
Greene/Humphreys	50	0.23	0.37	0.56	0.38	0.25	37	0.28	0.44	0.56	0.40	0.32	-0.29	0.771
St.Clair	35	0.31	0.43	0.56	0.41	0.23	31	0.37	0.48	0.58	0.48	0.19	-1.42	0.162
Maricopa	20	0.43	0.52	0.68	0.53	0.20	32	0.15	0.36	0.61	0.38	0.36	1.93	0.060
Mingo	47	0.22	0.45	0.57	0.39	0.28	53	0.26	0.40	0.57	0.39	0.30	0.12	0.904
VITAMIN B12 (MCG)														
Greene/Humphreys	50	1.68	2.35	3.60	2.84	1.75	37	1.92	2.73	3.63	3.19	2.25	-0.78	0.440
St.Clair	35	2.03	2.70	3.61	2.87	1.32	31	2.32	3.02	3.85	3.30	1.44	-1.25	0.218
Maricopa	20	2.70	3.33	4.79	3.66	1.49	32	1.43	2.31	4.09	3.13	2.22	1.04	0.301
Mingo	47	1.66	2.80	3.74	2.94	1.67	53	1.83	2.51	3.73	2.94	1.80	0.01	0.992

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-47 (continued)

Total 24-Hour Nutrient Intake for Posttested Non-Head Start Children (Samples A, B, C) with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	50	52.06	124.54	186.60	134.72	92.50	40	44.37	116.10	182.63	125.12	89.70	0.50	0.620
St.Clair	35	22.98	115.12	165.97	117.08	105.00	33	73.23	132.31	250.54	174.14	130.00	-1.98	0.052
Maricopa	19	34.64	66.44	86.09	68.42	48.90	31	43.33	85.66	125.25	85.31	53.90	-1.14	0.261
Mingo	47	23.37	60.60	118.16	83.70	78.30	53	41.06	65.15	88.79	77.01	59.90	0.48	0.636
CHOLESTEROL (MG)														
Greene/Humphreys	48	149.96	212.31	423.86	307.48	204.00	40	140.77	241.84	372.11	280.39	173.00	0.67	0.502
St.Clair	35	171.33	368.27	616.79	383.36	233.00	31	170.11	219.29	490.55	326.17	217.00	1.03	0.306
Maricopa	20	122.89	367.86	606.87	380.00	241.00	32	108.98	292.77	426.62	302.91	209.00	1.18	0.247
Mingo	47	154.40	348.69	460.06	340.26	217.00	55	140.70	262.74	466.25	333.22	242.00	0.16	0.877

Table 6-48

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	6	1198.	1416.	2049	1605.	537.	4	961.	1032.	1521.	1241.	474.	1.13	0.297
St.Clair	19	1673.	2079.	2559.	2059.	516.	13	1386.	1813.	2123.	1781.	441.	1.63	0.115
Maricopa	21	1015.	1355.	1678.	1344.	462.	19	1069.	1264.	1422.	1259.	355.	0.65	0.519
Mingo	20	1067.	1475.	1848.	1492.	441.	19	1252.	1518.	1776.	1578.	561.	-0.53	0.597
PROTEIN (GM)														
Greene/Humphreys	5	40.06	47.93	49.51	51.25	20.60	4	24.30	37.25	58.98	41.64	21.30	0.68	0.520
St.Clair	19	56.92	76.05	84.53	73.76	19.70	13	49.80	59.77	75.84	63.77	23.60	1.26	0.222
Maricopa	21	39.82	46.10	52.82	44.82	12.90	20	37.07	42.98	55.76	47.77	20.30	-0.55	0.585
Mingo	20	39.26	43.23	64.99	53.75	19.80	18	36.81	54.08	56.97	51.31	17.90	0.40	0.591
FAT (GM)														
Greene/Humphreys	6	38.94	54.68	112.28	69.74	37.30	4	26.31	36.06	69.42	47.87	31.60	1.00	0.352
St.Clair	18	72.67	93.90	110.78	90.03	28.50	13	58.39	71.21	86.24	76.86	22.30	1.44	0.160
Maricopa	21	41.12	53.03	77.45	58.32	22.40	20	36.63	47.02	57.86	52.55	25.90	0.76	0.451
Mingo	20	43.33	56.28	78.60	63.43	25.30	18	53.06	59.44	77.50	62.03	20.90	0.19	0.852
CARBOHYDRATE (GM)														
Greene/Humphreys	6	144.00	167.07	219.16	183.97	51.00	4	138.89	158.73	186.27	162.58	38.00	0.76	0.470
St.Clair	19	173.58	206.57	287.53	231.85	81.80	13	162.82	222.31	252.39	211.71	56.50	0.82	0.417
Maricopa	21	102.52	159.48	193.01	161.94	69.90	19	122.92	164.37	202.32	160.70	48.80	0.07	0.948
Mingo	20	126.41	180.51	214.40	178.95	59.40	19	146.54	169.67	234.83	191.93	75.10	-0.60	0.555

Table 6-48 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	6	422.	520.	678.	531.	190.	4	331.	337.	378.	355.	40.	2.21	0.069
St.Clair	19	505.	635.	789.	697.	316.	13	631.	739.	841.	758.	336.	-0.52	0.605
Maricopa	21	440.	588.	734.	589.	261.	20	444.	601.	868.	664.	356.	-0.76	0.451
Mingo	20	443.	591.	831.	651.	292.	19	530.	878.	982.	792.	342.	-1.38	0.178
IRON (MG)														
Greene/Humphreys	5	8.24	9.15	9.26	10.34	3.87	4	6.47	7.71	8.96	7.71	1.44	1.40	0.221
St.Clair	16	10.37	14.04	16.07	13.39	4.02	13	9.01	10.09	13.97	11.88	5.17	0.87	0.396
Maricopa	21	6.57	8.41	10.01	8.63	3.49	19	6.43	9.72	11.19	9.00	3.53	-0.33	0.741
Mingo	20	8.12	9.22	10.07	8.61	2.52	15	6.20	8.98	9.63	8.74	3.49	0.82	0.420
MAGNESIUM (MG)														
Greene/Humphreys	6	168.98	210.20	236.80	203.45	66.90	4	85.18	102.50	159.34	122.26	53.70	2.12	0.067
St.Clair	19	173.85	227.25	270.20	226.65	83.60	13	164.53	190.23	240.62	205.30	69.40	0.79	0.438
Maricopa	21	79.19	128.54	178.88	136.99	66.00	19	106.83	151.66	173.61	154.14	63.20	-0.84	0.407
Mingo	20	111.36	154.58	184.20	152.03	52.90	19	143.92	184.95	228.83	196.17	70.20	-2.21	0.034
PHOSPHORUS (MG)														
Greene/Humphreys	6	655.	783.	1229.	932.	414.	4	379.	492.	773.	576.	266.	1.66	0.136
St.Clair	19	837.	1115.	1198.	1047.	275.	13	752.	1023.	1185.	1039.	438.	0.05	0.958
Maricopa	21	656.	756.	884.	777.	268.	20	580.	759.	959.	830.	367.	-0.52	0.603
Mingo	20	611.	862.	1038.	891.	317.	19	794.	1060.	1273.	1031.	421.	-1.17	0.250

Table 6-48 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	6	3.01	3.45	3.74	3.47	0.51	4	3.29	3.33	3.55	3.42	0.21	0.20	0.845
St.Clair	19	3.45	3.67	3.80	3.61	0.26	13	3.26	3.42	3.64	3.40	0.35	1.82	0.083
Maricopa	19	3.06	3.24	3.33	3.22	0.27	20	3.19	3.35	3.63	3.42	0.36	-2.05	0.048
Mingo	20	3.25	3.42	3.53	3.41	0.27	19	3.38	3.71	3.85	3.61	0.30	-2.27	0.030
VITAMIN A (IU)														
Greene/Humphreys	6	1020.	2990.	5468.	5377.	6924.	4	1944.	2153.	3896.	2920.	1686.	0.83	0.437
St.Clair	19	2816.	4700.	6344.	4722.	2367.	13	1809.	2557.	4358.	3261.	2220.	1.78	0.086
Maricopa	19	1153.	1724.	2137.	1984.	1400.	20	1552.	2265.	4321.	3786.	3826.	-1.97	0.060
Mingo	20	1792.	2664.	3428.	3004.	1749.	19	2407.	5182.	7108.	5040.	2945.	-2.61	0.014
THIAMIN (MG)														
Greene/Humphreys	6	1.04	1.46	1.55	1.38	0.31	4	1.00	1.12	1.26	1.13	0.15	1.73	0.122
St.Clair	18	1.20	1.63	1.98	1.67	0.58	13	0.97	1.25	1.79	1.32	0.66	1.51	0.145
Maricopa	20	0.48	0.82	1.09	0.83	0.38	19	0.77	0.85	1.26	1.04	0.41	-1.68	0.102
Mingo	20	0.93	1.02	1.37	1.16	0.43	17	0.78	0.93	1.63	1.22	0.66	-0.32	0.752
RIBOFLAVIN (MG)														
Greene/Humphreys	5	0.93	1.27	1.38	1.25	0.46	4	0.98	1.10	1.38	1.18	0.27	0.26	0.800
St.Clair	19	1.57	1.90	2.23	1.89	0.74	13	1.24	1.65	2.07	1.64	0.72	1.37	0.183
Maricopa	20	0.87	1.22	1.44	1.25	0.53	20	1.02	1.36	1.74	1.46	0.57	-1.17	0.248
Mingo	20	1.20	1.51	1.75	1.55	0.56	17	1.13	1.58	2.04	1.61	0.73	-0.27	0.786

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-48 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	5	10.38	10.45	13.36	12.46	3.27	4	8.90	12.36	15.98	12.44	4.09	0.01	0.993
St.Clair	18	15.30	19.54	24.77	20.02	8.06	12	8.67	14.26	18.39	14.80	8.14	1.73	0.097
Maricopa	20	5.54	8.53	12.81	9.57	4.73	19	6.71	9.85	15.86	11.03	5.10	-0.93	0.358
Mingo	20	9.83	12.07	17.42	13.80	5.03	15	7.31	9.74	13.60	10.79	6.10	1.56	0.132
VITAMIN B6 (MG)														
Greene/Humphreys	6	0.77	1.42	1.80	1.41	0.63	4	0.67	1.08	1.52	1.10	0.49	0.90	0.396
St.Clair	17	0.90	1.51	1.91	1.53	0.68	12	0.55	0.90	1.30	1.06	0.71	1.77	0.089
Maricopa	21	0.57	0.74	1.13	0.88	0.49	20	0.67	1.19	1.73	1.24	0.56	-2.20	0.034
Mingo	20	0.82	1.08	1.37	1.13	0.51	16	0.64	0.98	1.46	1.20	0.77	-0.33	0.744
LOG VIT. B12 (MCG)														
Greene/Humphreys	5	0.12	0.20	0.61	0.29	0.32	4	-0.14	0.04	0.30	0.08	0.26	1.11	0.305
St.Clair	19	0.54	0.65	0.83	0.67	0.21	13	0.30	0.44	0.54	0.43	0.16	3.69	0.001
Maricopa	20	0.30	0.46	0.56	0.44	0.26	20	0.29	0.45	0.57	0.43	0.22	0.09	0.929
Mingo	20	0.45	0.47	0.56	0.49	0.12	19	0.34	0.54	0.71	0.49	0.42	0.03	0.974
VITAMIN B12 (MCG)														
Greene/Humphreys	5	1.32	1.58	4.10	3.42	1.65	4	0.72	1.20	2.03	1.37	0.81	1.24	0.260
St.Clair	19	3.45	4.43	6.70	5.25	2.55	13	2.02	2.75	3.48	2.86	0.94	3.74	0.001
Maricopa	20	2.02	2.92	3.62	3.23	1.94	20	1.95	2.84	3.72	3.04	1.51	0.35	0.727
Mingo	20	2.82	2.99	3.62	3.21	0.83	19	2.21	3.44	5.14	4.35	3.45	-1.40	0.176

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-48 (continued)

Total 24-Hour Nutrient Intake for Posttested Children (Samples A, B, C) Absent from Head Start on Day of Recall with Unadjusted Comparisons Between Males and Females within Site

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	6	13.54	147.79	203.29	127.69	58.50	4	68.38	108.39	135.93	102.16	55.60	0.52	0.616
St.Clair	19	119.91	167.82	224.81	176.74	94.00	13	72.81	130.87	246.69	182.21	132.00	-0.13	0.899
Maricopa	21	16.53	36.19	66.71	70.46	76.10	18	41.79	72.17	138.28	95.06	69.20	-1.06	0.297
Mingo	20	19.72	70.92	112.18	77.23	65.80	18	57.53	93.46	138.65	111.11	74.50	-1.50	0.142
CHOLESTEROL (MG)														
Greene/Humphreys	5	143.65	160.20	176.60	263.93	277.00	4	102.30	246.63	437.37	269.83	197.00	-0.04	0.971
St.Clair	19	235.40	421.08	560.06	441.79	226.00	13	190.02	266.27	457.25	343.82	228.00	1.20	0.241
Maricopa	21	161.78	359.08	395.38	318.52	188.00	20	115.45	310.63	433.00	313.01	203.00	0.09	0.929
Mingo	20	152.06	349.48	468.88	356.79	220.00	18	177.82	365.41	513.38	344.84	200.00	0.18	0.860

Table 6-49

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups across Sites

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	107	1315.	1539.	1876.	1646.	504.	260	1374.	1752.	2134.	1768.	530.	-2.06	0.040
PROTEIN (GM)	109	42.15	56.20	69.69	58.88	21.60	264	46.29	63.26	80.42	64.82	23.40	-2.36	0.019
FAT (GM)	106	51.11	63.27	82.89	67.97	24.90	259	54.79	71.92	88.99	73.16	25.60	-1.79	0.074
CARBOHYDRATE (GM)	106	151.32	187.32	245.80	199.30	66.60	261	165.38	209.44	258.38	215.89	72.50	-2.11	0.036
CALCIUM (MG)	109	467.90	701.47	931.31	730.94	361.00	260	540.96	801.16	1134.57	855.73	416.00	-2.89	0.004
IRON (MG)	106	7.55	9.08	11.99	10.26	4.03	256	8.62	10.69	14.16	11.39	3.92	-2.44	0.015
MAGNESIUM (MG)	109	151.51	180.38	234.60	194.32	77.70	262	146.55	204.83	269.62	215.87	91.90	-2.30	0.022
PHOSPHORUS (MG)	109	770.	979.	1179.	1001.	373.	264	772.	1063.	1401.	1114.	440.	-2.53	0.012
LOG VITAMIN A (IU)	108	3.23	3.45	3.73	3.50	0.38	260	3.31	3.51	3.75	3.54	0.34	-0.89	0.376
VITAMIN A (IU)	108	1702.	2802.	5350.	5149.	7713.	260	2045.	3275.	5647.	4836.	5548.	0.38	0.702
THIAMIN (MG)	109	0.81	1.10	1.45	1.19	0.50	259	0.93	1.26	1.66	1.33	0.55	-2.40	0.017
RIBOFLAVIN (MG)	107	1.17	1.50	1.88	1.61	0.70	257	1.23	1.73	2.35	1.84	0.77	-2.69	0.008
NIACIN (MG)	109	9.02	12.04	17.40	13.97	6.52	258	10.03	13.58	18.37	14.80	6.40	-1.13	0.261
VITAMIN B6 (MG)	105	0.70	1.05	1.43	1.10	0.49	260	0.88	1.25	1.72	1.32	0.57	-3.79	0.000
LOG VIT. B12 (MCG)	104	0.31	0.45	0.57	0.42	0.25	258	0.40	0.56	0.69	0.54	0.25	-3.87	0.000
VITAMIN B12 (MCG)	104	2.06	2.83	3.71	3.09	1.76	258	2.53	3.62	4.91	4.01	2.28	-4.12	0.000
VITAMIN C (MG)	107	39.34	95.38	174.83	115.67	91.80	258	44.77	102.72	170.16	115.11	83.80	0.05	0.956
CHOLESTEROL (MG)	107	175.91	306.42	480.04	342.95	198.00	261	169.48	324.04	475.29	352.33	209.00	-0.41	0.685

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-50

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES														
Greene/Humphreys	39	1269.	1374.	1692.	1493.	431.	61	1334.	1654.	1933.	1682.	486.	-2.04	0.044
St.Clair	30	1495.	1765.	2248.	1855.	524.	60	1713.	2023.	2420.	2056.	503.	-1.74	0.087
Maricopa	0						72	1260.	1520.	1868.	1548.	484.		
Mingo	38	1365.	1542.	1876.	1639.	513.	67	1462.	1782.	2289.	1824.	520.	-1.76	0.082
PROTEIN (GM)														
Greene/Humphreys	40	41.81	52.50	69.21	56.50	19.50	61	47.93	62.75	79.81	64.78	21.00	-2.02	0.046
St.Clair	30	50.65	66.58	79.82	64.92	23.20	61	54.97	74.63	91.45	73.66	23.90	-1.67	0.100
Maricopa	0						72	39.37	54.75	65.19	55.48	19.60		
Mingo	39	40.66	51.99	68.49	56.69	22.10	70	44.63	66.18	84.17	66.79	25.30	-2.17	0.033
FAT (MG)														
Greene/Humphreys	39	49.40	57.71	70.51	60.19	18.70	60	50.86	64.66	83.77	67.98	24.80	-1.78	0.079
St.Clair	29	56.91	75.21	98.40	79.03	28.10	60	71.21	83.32	108.16	86.78	25.90	-1.25	0.217
Maricopa	0						72	50.09	63.55	83.94	67.33	25.60		
Mingo	38	48.96	64.02	82.89	67.51	25.30	67	59.27	72.80	86.61	71.86	21.80	-0.89	0.377
CARBOHYDRATE (GM)														
Greene/Humphreys	39	147.50	175.76	227.66	184.40	60.50	60	157.07	201.24	235.64	198.92	56.40	-1.28	0.204
St.Clair	30	171.91	205.00	268.16	218.80	71.20	60	198.04	234.47	309.23	249.33	73.30	-1.90	0.062
Maricopa	0						72	149.18	180.64	230.47	181.79	60.70		
Mingo	37	149.27	185.96	243.05	199.20	66.60	69	183.82	235.20	291.79	236.26	77.10	-2.58	0.012

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Table 6-50 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	40	432.11	752.14	928.48	687.50	285.00	61	537.83	773.24	963.86	798.47	334.00	-1.79	0.077
St.Clair	30	493.50	697.82	973.47	757.71	379.00	60	546.54	810.07	120€.11	881.80	487.00	-1.44	0.155
Maricopa	0						70	492.41	731.91	962.88	746.29	343.00		
Mingo	39	454.59	674.32	971.23	754.81	417.00	69	617.42	934.12	1275.81	985.91	448.00	-2.69	0.009
IRON (MG)														
Greene/Humphreys	39	7.31	8.67	11.63	9.78	3.84	58	8.24	10.69	14.48	11.26	3.84	-1.83	0.070
St.Clair	28	8.37	10.04	14.89	11.80	4.50	58	10.08	12.79	15.07	12.93	3.82	-1.14	0.261
Mariccpa	0						68	7.38	9.93	11.91	9.99	3.42		
Mingo	39	7.20	8.94	11.30	9.63	3.53	71	8.79	10.28	14.18	11.59	4.10	-2.63	0.010
MAGNESIUM (MG)														
Greene/Humphreys	40	150.57	181.19	223.19	188.65	72.80	62	166.22	213.29	258.64	216.28	74.40	-1.86	0.067
St.Clair	30	133.59	183.57	277.63	207.78	92.20	60	184.87	236.36	343.19	256.27	103.00	-2.26	0.027
Maricopa	0						73	125.05	163.84	245.31	176.67	80.80		
Mingo	39	154.89	177.19	218.36	189.77	71.00	67	152.14	205.17	298.48	222.04	92.30	-2.02	0.047
PHOSPHORUS (MG)														
Greene/Humphreys	40	768.	990.	1135.	955.	345.	62	791.	1054.	1320.	1108.	424.	-1.99	0.049
St.Clair	30	760.	1080	1226.	1003.	375.	60	790.	1197.	1491.	1179.	476.	-1.91	0.060
Maricopa	0						72	719.	888	1251.	987.	370.		
Mingo	39	804.	973.	1190.	1045.	402.	70	844.	1214.	1578.	1216.	457.	-2.03	0.046

Table 6-50 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	40	3.23	3.47	3.85	3.60	0.48	61	3.40	3.60	3.83	3.67	0.37	-0.79	0.429
St.Clair	30	3.28	3.40	3.63	3.48	0.31	60	3.39	3.67	3.88	3.62	0.34	-2.02	0.047
Maricopa	0						69	3.16	3.38	3.56	3.38	0.30		
Mingo	38	3.21	3.40	3.56	3.41	0.30	70	3.30	3.48	3.71	3.50	0.29	-1.58	0.120
VITAMIN A (IU)														
Greene/Humphreys	40	1712.	2943.	7084.	7876.	11681.	61	2535.	3954.	6767.	7254.	8604.	0.28	0.780
St.Clair	30	1818.	2536.	4241.	4010.	3649.	60	2443.	4700.	7684.	5458.	3728.	-1.76	0.083
Maricopa	0						69	1456.	2388.	3607.	3025.	2312.		
Mingo	38	1610.	2505.	3840.	3179.	2169.	70	2000.	2913.	5192.	3981.	2843.	-1.61	0.110
THIAMIN (MG)														
Greene/Humphreys	40	0.83	1.06	1.28	1.15	0.52	61	0.94	1.34	1.69	1.36	0.51	-2.01	0.048
St.Clair	30	0.89	1.25	1.65	1.33	0.55	60	1.13	1.48	1.94	1.60	0.62	-2.08	0.041
Maricopa	0						69	0.75	1.02	1.31	1.06	0.45		
Mingo	39	0.79	1.00	1.38	1.12	0.43	69	0.98	1.26	1.68	1.34	0.49	-2.42	0.018
RIBOFLAVIN (MG)														
Greene/Humphreys	39	1.17	1.47	1.90	1.65	0.77	57	1.32	1.79	2.16	1.78	0.63	-0.83	0.407
St.Clair	30	1.17	1.61	2.15	1.72	0.74	61	1.49	2.01	2.87	2.11	0.92	-2.22	0.030
Maricopa	0						69	1.05	1.41	1.95	1.55	0.67		
Mingo	38	1.16	1.47	1.83	1.50	0.57	70	1.35	1.89	2.45	1.93	0.73	-3.42	0.001

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-50 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	40	10.35	12.93	18.00	14.17	5.83	59	11.24	14.65	18.49	15.63	6.08	-1.20	0.232
St.Clair	30	10.31	14.75	22.16	16.01	7.35	60	13.15	16.54	21.39	17.88	6.63	-1.17	0.247
Maricopa	0						70	7.63	11.33	14.93	11.82	5.18		
Mingo	39	7.54	10.51	14.77	12.19	6.17	69	9.50	13.11	18.82	14.44	6.29	-1.81	0.074
VITAMIN B6 (MG)														
Greene/Humphreys	37	0.75	1.15	1.37	1.12	0.48	62	1.09	1.38	1.82	1.44	0.48	-3.19	0.002
St.Clair	29	0.84	1.10	1.51	1.18	0.48	57	0.91	1.47	1.91	1.48	0.66	-2.46	0.016
Maricopa	0						71	0.74	1.13	1.43	1.13	0.53		
Mingo	39	0.62	1.01	1.29	1.02	0.49	70	0.89	1.19	1.71	1.29	0.56	-2.59	0.011
LOG VIT. B12 (MCG)														
Greene/Humphreys	36	0.21	0.41	0.49	0.36	0.25	57	0.32	0.55	0.64	0.50	0.25	-2.67	0.009
St.Clair	30	0.32	0.49	0.61	0.48	0.25	60	0.48	0.59	0.81	0.59	0.28	-2.00	0.050
Maricopa	0						71	0.38	0.51	0.67	0.51	0.25		
Mingo	38	0.35	0.47	0.57	0.44	0.25	70	0.47	0.59	0.69	0.54	0.22	-2.12	0.037
VITAMIN B12 (MCG)														
Greene/Humphreys	36	1.63	2.57	3.10	2.67	1.58	57	2.10	3.52	4.33	3.83	2.86	-2.50	0.014
St.Clair	30	2.11	3.08	4.08	3.49	2.09	60	2.99	3.91	6.46	4.67	2.57	-2.33	0.023
Maricopa	0						71	2.42	3.25	4.66	3.73	2.01		
Mingo	38	2.25	2.95	3.74	3.17	1.59	70	2.95	3.89	4.90	3.88	1.57	-2.23	0.029

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-50 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Males (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	39	50.42	95.38	169.60	113.00	78.70	62	49.28	117.68	202.52	130.47	84.40	-1.00	0.318
St.Clair	30	71.42	133.83	225.17	145.82	104.00	60	105.54	148.42	217.94	158.44	89.40	-0.61	0.542
Maricopa	0						71	36.13	62.39	119.08	83.41	65.80		
Mingo	38	22.89	63.19	133.51	94.62	90.10	65	37.62	83.23	132.66	84.16	62.80	0.03	0.978
CHOLESTEROL (MG)														
Greene/Humphreys	39	158.05	263.71	417.11	288.80	155.00	58	166.59	249.70	449.97	331.25	206.00	-1.16	0.251
St.Clair	30	196.09	394.68	644.40	404.33	231.00	60	226.70	407.87	512.88	403.84	204.00	0.01	0.992
Maricopa	0						73	152.74	284.69	533.15	345.16	229.00		
Mingo	38	178.11	350.78	469.12	350.08	200.00	70	198.39	294.63	449.34	333.13	190.00	0.43	0.669

Table 6-51

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups across Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILOCALORIES	118	1234.	1509.	1820.	1567.	452.	250	1248.	1527.	1946.	1597.	516.	-0.57	0.572
PROTEIN (GM)	119	46.26	58.56	70.58	58.52	19.50	248	41.80	55.04	70.61	57.25	22.10	0.56	0.579
FAT (GM)	118	48.64	60.65	76.63	63.88	22.00	249	46.61	64.36	78.70	64.95	25.40	-0.41	0.682
CARBOHYDRATE (GM)	119	153.50	186.34	226.97	196.07	65.80	250	155.49	188.71	240.79	198.14	67.20	-0.28	0.779
CALCIUM (MG)	119	534.54	774.08	1000.23	798.39	353.00	251	526.81	819.75	1096.59	823.66	376.00	-0.63	0.530
IRON (MG)	117	7.26	9.56	12.07	10.13	3.97	240	7.24	9.86	12.35	10.16	4.04	-0.08	0.935
MAGNESIUM (MG)	119	158.52	189.57	241.53	201.99	65.00	249	146.40	198.40	250.27	206.09	86.50	-0.51	0.613
PHOSPHORUS (MG)	118	797.	1011.	1239.	1032.	356.	250	740.	1002.	1320.	1035.	416.	-0.07	0.946
LOG VITAMIN A (IU)	114	3.34	3.55	3.77	3.58	0.41	247	3.34	3.55	3.79	3.57	0.35	0.20	0.840
VITAMIN A (IU)	114	2199.	3523.	5902.	6307.	8257.	247	2175.	3569.	6115.	5268.	5328.	1.23	0.220
THIAMIN (MG)	116	0.82	1.17	1.44	1.20	0.50	241	0.82	1.10	1.55	1.20	0.53	-0.04	0.967
RIBOFLAVIN (MG)	115	1.24	1.69	2.15	1.76	0.74	245	1.19	1.67	2.23	1.76	0.76	0.06	0.950
NIACIN (MG)	118	9.45	13.70	17.26	13.96	5.85	241	8.61	11.76	16.80	13.27	6.47	1.02	0.310
VITAMIN B6 (MG)	116	0.89	1.20	1.49	1.20	0.48	243	0.81	1.17	1.63	1.25	0.61	-0.89	0.372
LOG VIT. B12 (MCG)	108	0.34	0.48	0.62	0.46	0.29	243	0.34	0.51	0.67	0.48	0.28	-0.64	0.520
VITAMIN B12 (MCG)	108	2.21	3.05	4.14	3.50	2.33	243	2.19	3.21	4.64	3.66	2.43	-0.57	0.567
VITAMIN C (MG)	118	65.25	99.71	173.24	122.27	85.10	247	50.93	98.45	163.24	120.52	92.30	0.18	0.858
CHOLESTEROL (MG)	117	180.19	267.06	433.35	328.33	199.00	250	161.28	266.96	456.54	323.57	211.00	0.21	0.834

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-52

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
KILUCALORIES														
Greene/Humphreys	41	1317.	1478.	1556.	1482.	333.	66	1288.	1530.	1920.	1601.	491.	-1.49	0.139
St.Clair	34	1443.	1599.	2191.	1770.	531.	46	1583.	1791.	2208.	1907.	451.	-1.21	0.231
Maricopa	0						77	1115.	1299.	1597.	1378.	473.		
Mingo	43	1210.	1499.	1765.	1488.	441.	61	1319.	1576.	1975.	1636.	519.	-1.57	0.120
PROTEIN (GM)														
Greene/Humphreys	41	48.44	60.00	67.07	58.07	16.10	65	44.33	56.75	73.28	59.28	20.50	-0.34	0.736
St.Clair	34	52.19	62.69	83.60	65.87	19.00	47	52.62	62.23	73.81	66.94	21.90	-0.23	0.816
Maricopa	0						76	33.64	46.21	64.51	49.31	20.60		
Mingo	44	36.64	51.76	64.82	53.25	21.40	60	39.57	55.16	75.89	57.53	22.90	-0.98	0.330
FAT (MG)														
Greene/Humphreys	41	47.98	58.05	71.47	59.31	18.80	65	48.45	61.95	81.31	63.44	24.90	-0.97	0.334
St.Clair	34	51.46	71.51	89.98	72.43	24.20	47	62.54	69.42	82.68	77.46	24.10	-0.92	0.358
Maricopa	0						78	39.88	53.49	70.84	58.42	26.20		
Mingo	43	49.73	60.69	77.96	61.50	21.70	59	51.06	66.67	77.42	65.27	22.70	-0.85	0.398
CARBOHYDRATE (GM)														
Greene/Humphreys	41	161.29	190.39	214.21	183.19	42.90	67	160.19	198.25	235.23	201.62	61.80	-1.83	0.071
St.Clair	34	161.15	196.01	276.43	218.07	79.30	46	191.57	243.33	292.41	244.94	66.90	-1.60	0.115
Maricopa	0						76	125.69	168.19	202.32	164.85	54.60		
Mingo	44	143.25	179.96	237.24	191.07	69.10	61	154.33	187.31	242.74	200.50	66.00	-0.70	0.484

Table 6-52 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CALCIUM (MG)														
Greene/Humphreys	41	490.43	758.73	944.21	740.65	314.00	67	550.97	874.91	1139.03	854.84	350.00	-1.62	0.110
St.Clair	34	605.03	790.07	1105.81	860.45	356.00	46	634.57	815.98	1102.62	864.12	406.00	-0.04	0.966
Maricopa	0						77	476.26	695.42	950.05	740.43	360.00		
Mingo	44	535.59	764.60	1011.71	795.85	384.00	61	523.60	860.85	1129.50	863.95	381.00	-0.89	0.376
IRON (MG)														
Greene/Humphreys	41	8.23	9.82	11.89	10.16	3.12	61	6.98	9.53	12.77	10.29	4.23	-0.17	0.864
St.Clair	34	7.27	10.83	14.24	11.16	4.81	47	9.98	12.08	15.12	12.73	4.07	-1.54	0.128
Maricopa	0						75	6.43	8.54	10.86	8.64	3.19		
Mingo	42	6.41	9.26	10.96	9.25	3.84	57	7.24	9.79	12.24	9.92	3.82	-0.86	0.394
MAGNESIUM (MG)														
Greene/Humphreys	41	164.44	201.85	230.56	197.59	51.40	66	179.66	220.29	265.04	223.89	89.10	-1.93	0.056
St.Clair	34	160.45	189.90	270.64	210.53	73.50	47	180.17	229.63	337.92	251.63	89.60	-2.26	0.026
Maricopa	0						76	111.72	162.91	207.37	167.74	67.90		
Mingo	44	155.80	174.86	237.00	199.49	70.10	60	133.63	203.49	249.63	199.39	81.40	0.01	0.995
PHOSPHORUS (MG)														
Greene/Humphreys	41	804.	1025.	1161.	997.	289.	66	800.	1090.	1330.	1104.	423.	-1.53	0.130
St.Clair	34	852.	1081.	1311.	1132.	391.	46	821.	1106.	1409.	1116.	393.	0.18	0.855
Maricopa	0						77	614.	847.	1117.	890.	359.		
Mingo	43	706.	948.	1159.	987.	370.	61	760.	1065.	1384.	1084.	454.	-1.20	0.234

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Table 6-52 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
LOG VITAMIN A (IU)														
Greene/Humphreys	40	3.39	3.66	4.04	3.73	0.44	66	3.41	3.64	3.95	3.69	0.38	0.52	0.607
St.Clair	32	3.28	3.48	3.78	3.54	0.44	47	3.37	3.55	3.85	3.61	0.37	-0.72	0.476
Maricopa	0						76	[illegible]	3.44	3.67	3.48	0.31		
Mingo	42	3.35	3.50	3.67	3.46	0.31	58	3.37	3.59	3.72	3.53	0.30	-1.08	0.283
VITAMIN A (IU)														
Greene/Humphreys	40	2445.	4601.	11032.	9350.	11172.	66	2544.	4377.	8810.	7286.	7128.	1.05	0.300
St.Clair	32	1896.	3066.	6007.	6007.	7896.	47	2348.	3539.	7111.	6037.	6688.	-0.02	0.986
Maricopa	0						76	1819.	2738.	4724.	3869.	3152.		
Mingo	42	2217.	3149.	4702.	3637.	2374.	58	2350.	3896.	5261.	4182.	2532.	-1.10	0.274
THIAMIN (MG)														
Greene/Humphreys	41	0.95	1.19	1.43	1.20	0.48	62	0.95	1.17	1.60	1.25	0.52	-0.42	0.674
St.Clair	34	1.01	1.30	1.71	1.35	0.57	46	1.07	1.30	1.92	1.51	0.59	-1.23	0.223
Maricopa	0						75	0.76	0.89	1.20	0.97	0.40		
Mingo	41	0.74	1.02	1.32	1.07	0.43	58	0.83	1.14	1.65	1.20	0.51	-1.41	0.162
RIBOFLAVIN (MG)														
Greene/Humphreys	40	1.32	1.69	2.34	1.85	0.72	63	1.31	1.76	2.32	1.86	0.80	-0.10	0.920
St.Clair	32	1.18	1.68	2.35	1.81	0.81	46	1.41	1.97	2.39	2.02	0.82	-1.13	0.261
Maricopa	0						77	1.06	1.45	1.84	1.51	0.62		
Mingo	43	1.20	1.69	2.06	1.65	0.70	59	1.09	1.78	2.30	1.76	0.76	-0.77	0.443

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-52 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
NIACIN (MG)														
Greene/Humphreys	41	11.65	14.15	16.90	14.34	4.70	62	8.87	12.19	18.04	14.14	6.83	0.18	0.860
St.Clair	34	9.34	13.90	16.31	14.86	7.13	46	11.43	16.76	21.44	17.06	8.62	-1.40	0.165
Maricopa	0						75	7.17	9.91	12.99	10.70	4.90		
Mingo	43	9.11	11.80	17.77	12.89	5.70	56	8.16	11.56	15.53	12.65	6.35	0.20	0.846
VITAMIN B6 (MG)														
Greene/Humphreys	40	1.08	1.22	1.50	1.23	0.38	61	0.83	1.11	1.62	1.25	0.55	-0.20	0.842
St.Clair	34	0.81	1.14	1.44	1.19	0.55	46	1.00	1.34	1.82	1.45	0.68	-1.91	0.060
Maricopa	0						78	0.68	1.08	1.49	1.15	0.55		
Mingo	42	0.77	1.14	1.49	1.18	0.53	58	0.71	1.19	1.63	1.24	0.65	-0.51	0.608
LOG VIT. B12 (MCG)														
Greene/Humphreys	35	0.40	0.48	0.61	0.47	0.30	62	0.37	0.53	0.67	0.53	0.31	-0.90	0.373
St.Clair	30	0.39	0.54	0.61	0.52	0.19	45	0.43	0.51	0.67	0.53	0.18	-0.24	0.814
Maricopa	0						77	0.29	0.47	0.61	0.43	0.28		
Mingo	43	0.28	0.44	0.62	0.42	0.33	59	0.35	0.50	0.67	0.47	0.30	-0.87	0.387
VITAMIN B12 (MCG)														
Greene/Humphreys	35	2.50	3.05	4.05	3.67	2.84	62	2.34	3.42	4.66	4.29	3.58	-0.94	0.352
St.Clair	30	2.43	3.46	4.04	3.59	1.82	45	2.71	3.27	4.88	3.64	1.46	-0.12	0.901
Maricopa	0						77	1.97	2.96	4.12	3.20	1.78		
Mingo	43	1.91	2.78	4.18	3.29	2.33	58	2.24	3.19	4.67	3.60	2.18	-0.68	0.500

Note: Vitamin A and Vitamin B12 have been transformed to the logarithmic scale (base 10) for analysis because of substantial skewness, which tends to invalidate the assumptions underlying the t test.

Table 6-52 (continued)

Total 24-Hour Nutrient Intake for Posttested Head Start and Non-Head Start Females (Samples A, B, C) with Unadjusted Comparisons Between Age Groups within Site

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VITAMIN C (MG)														
Greene/Humphreys	41	56.71	87.69	155.73	113.14	71.90	66	69.23	123.42	168.99	129.34	82.00	-1.07	0.286
St.Clair	34	101.74	151.30	244.22	174.78	106.00	47	108.01	165.52	298.08	196.20	124.00	-0.84	0.406
Maricopa	0						75	42.28	67.32	125.25	84.26	57.10		
Mingo	43	56.74	77.70	115.07	89.44	54.50	59	50.73	71.81	124.57	96.44	72.80	-0.56	0.580
CHOLESTEROL (MG)														
Greene/Humphreys	41	188.82	262.85	421.81	322.18	186.00	64	170.79	264.86	389.24	293.72	154.00	0.82	0.416
St.Clair	32	214.86	368.37	529.80	392.32	207.00	47	191.36	274.51	529.50	381.50	252.00	0.21	0.835
Maricopa	0						78	122.50	254.51	414.22	296.18	201.00		
Mingo	44	145.93	234.77	366.79	287.54	199.00	61	165.44	286.15	498.79	345.27	232.00	-1.37	0.175

CHAPTER SEVEN

APPENDIX TABLES

Table 7-1

Out-of-Range Hematology Values of Children Excluded from Analyses by Biochemical Indicator, Head Start/Non-Head Start and Race

Biochemical Indicator	Posttested Children (Samples A, B, C)					
	Head Start			Non-Head Start		
	White	Black	Hispanic	White	Black	Hispanic
Hematocrit %		45				
Hemoglobin gm.dl.		16		8	10	
FEP mcg/dl.	56	58 59		56 57	61 100 64	
Cholesterol mg/dl.	296 77	292	284			
Vitamin A mcg/dl.	61 60 105	143	370	70	10 52	
B-Carotene mcg/dl.	200 174		193 215			
Vitamin C mg/dl.						
TIBC mcg/dl.	425 481 460 460		464 215 425 216	483 151 461 459	473 216 425 192	
Serum Iron mcg/dl.	142 154	145 153 90	177 161 158	146	150 156 96	
TS	41 57	43 42 41 44	63 51	39 46 51 48	46 44	
MCHC %	40	47 30 45		42 22 25	37	
Ferritin ng/ml.		137 134 98		105 84 75	88 88	84

Table 7-2

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
HEMATOCRIT (%)												
Sample A	73	35.68	2.96	42	34.65	2.93	54	36.38	2.33	35	38.21	2.12
Sample B	52	35.99	2.48	37	35.88	2.18	11	37.09	1.28	31	38.46	1.70
Sample C	88	35.62	1.96	103	35.50	1.69	90	36.53	2.31	158	37.68	2.30
		F= 0.38	P= 0.681		F= 3.62	P= 0.029		F= 0.47	P= 0.626		F= 2.23	P= 0.110
HEMOGLOBIN (GM/DL)												
Sample A	72	12.57	1.09	42	12.31	1.07	53	13.09	0.62	35	13.24	0.83
Sample B	52	12.77	1.03	37	12.91	1.07	11	13.38	0.53	31	13.32	0.59
Sample C	88	12.79	0.81	103	12.56	0.83	88	13.00	0.83	153	13.18	0.87
		F= 1.06	P= 0.347		F= 4.06	P= 0.019		F= 1.33	P= 0.267		F= 0.45	P= 0.640
FEP (MCG/DL)												
Sample A	72	18.49	8.38	40	20.55	10.63	54	23.31	7.33	33	17.36	9.76
Sample B	50	19.60	9.59	38	26.84	12.12	11	25.45	9.03	28	15.25	6.30
Sample C	89	19.29	7.94	101	20.58	8.25	90	23.36	7.44	154	16.77	8.65
		F= 0.30	P= 0.744		F= 6.22	P= 0.002		F= 0.40	P= 0.668		F= 0.50	P= 0.606
MCHC (%)												
Sample A	72	35.24	1.77	42	35.56	1.71	53	35.89	1.75	35	34.67	1.45
Sample B	52	35.47	1.49	37	35.71	1.76	11	36.08	0.92	31	34.66	1.67
Sample C	88	35.92	1.81	102	35.30	1.87	86	35.60	1.75	149	34.96	1.41
		F= 3.17	P= 0.044		F= 0.79	P= 0.457		F= 0.71	P= 0.491		F= 0.96	P= 0.386

Table 7-2 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS
OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
TIBC (MCG/DL)												
Sample A	59	330.29	39.91	36	319.14	40.13	51	333.84	43.17	29	308.55	37.73
Sample B	45	333.51	44.14	36	327.42	32.21	11	341.45	34.56	30	323.07	36.35
Sample C	75	334.23	43.06	89	320.51	32.82	83	339.96	50.91	139	316.78	38.13
		F= 0.15	P= 0.858		F= 0.65	P= 0.524		F= 0.30	P= 0.743		F= 1.10	P= 0.336
SERUM IRON (MCG/DL)												
Sample A	64	67.14	21.84	37	66.70	28.20	53	78.64	30.46	31	66.10	23.50
Sample B	47	64.21	22.27	36	72.39	22.59	11	69.55	29.04	31	66.23	24.73
Sample C	79	65.46	26.43	91	75.29	24.09	86	83.10	27.45	139	67.99	24.59
		F= 0.21	P= 0.810		F= 1.58	P= 0.208		F= 1.27	P= 0.284		F= 0.12	P= 0.886
TS (%)												
Sample A	57	20.38	6.15	34	21.75	8.43	52	23.43	8.87	28	20.89	7.20
Sample B	44	19.48	6.47	36	22.26	7.32	11	20.43	8.43	30	19.73	6.98
Sample C	76	19.26	7.87	87	23.08	6.83	83	24.20	8.23	135	21.64	7.92
		F= 0.44	P= 0.645		F= 0.46	P= 0.634		F= 0.98	P= 0.378		F= 0.79	P= 0.454
FERRITIN (NG/DL)												
Sample A	55	23.24	9.54	37	36.24	49.23	51	20.51	12.21	28	19.86	10.10
Sample B	40	25.27	12.71	37	26.30	12.25	10	18.40	5.34	30	20.77	9.41
Sample C	75	26.96	11.87	89	29.36	16.32	77	20.90	10.27	136	22.74	11.97
		F= 1.70	P= 0.186		F= 1.36	P= 0.259		F= 0.24	P= 0.788		F= 0.96	P= 0.383

Table 7-2 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
B-CARUTENE (MCG/DL)												
Sample A	43	89.63	31.87	0			50	97.88	27.10	0		
Sample B	29	105.14	24.32	0			11	92.18	24.40	0		
Sample C	56	101.02	28.71	0			83	95.11	30.30	0		
		F= 2.99	P= 0.054					F= 0.25	P= 0.777			
CHOLESTEROL (MG/DL)												
Sample A	66	164.45	30.33	42	161.76	30.89	52	164.54	30.63	32	152.59	25.00
Sample B	48	169.06	30.98	37	173.81	29.28	11	161.00	31.68	31	149.87	22.58
Sample C	79	171.78	31.00	102	170.50	35.63	88	159.73	28.55	151	156.15	28.18
		F= 1.03	P= 0.360		F= 1.47	P= 0.232		F= 0.44	P= 0.647		F= 0.81	P= 0.445
VITAMIN A (MCG/DL)												
Sample A	42	38.83	9.63	0			51	36.43	7.38	0		
Sample B	28	39.76	10.76	0			11	32.36	7.26	0		
Sample C	54	34.81	7.41	0			81	36.44	6.78	0		
		F= 3.72	P= 0.027					F= 1.70	P= 0.186			
VITAMIN C (MG/DL)												
Sample A	0			0			38	1.38	0.43	0		
Sample B	0			0			11	1.46	0.40	0		
Sample C	0			0			60	1.46	0.49	0		
								F= 0.38	P= 0.685			

Table 7-3

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	434	35.0	36.0	38.0	36.3	2.4	340	35.0	36.5	38.0	36.6	2.6	-1.50	0.134
HEMOGLOBIN (GM/DL)	430	12.3	12.9	13.5	12.9	0.8	335	12.3	12.9	13.5	12.9	0.9	-0.84	0.400
FEP (MCG/DL)	429	14.0	19.0	24.0	19.8	8.7	331	13.0	19.0	25.0	20.1	9.6	-0.42	0.672
MCHC (%)	425	34.3	35.4	36.4	35.4	1.7	333	34.2	35.4	36.3	35.4	1.7	0.08	0.935
TIBC (MCG/DL)	383	297.0	325.0	353.0	327.2	41.1	300	298.0	322.0	350.0	325.8	41.2	0.45	0.653
SERUM IRON (MCG/DL)	385	51.0	67.0	87.0	69.9	25.7	310	54.0	69.0	91.0	72.4	26.1	-1.26	0.208
TS (%)	373	15.8	20.2	25.7	21.2	7.6	300	17.0	21.5	27.5	22.2	7.9	-1.73	0.084
FERRITIN (NG/DL)	374	15.0	22.0	30.0	24.4	12.9	291	15.0	21.0	31.0	24.8	21.0	-0.31	0.754
B-CAROTENE (MCG/DL)	155	80.5	102.0	121.0	101.9	29.4	117	71.0	90.0	107.0	90.3	27.1	3.36	0.001
CHOLESTEROL (MG/DL)	416	143.0	159.0	183.0	163.6	29.8	323	142.0	163.0	181.5	162.9	31.6	0.30	0.761
VITAMIN A (MCG/DL)	154	31.0	36.0	42.0	36.3	8.7	114	32.0	36.0	42.0	37.2	7.4	-0.85	0.398
VITAMIN C (MG/DL)	70	1.2	1.5	1.8	1.5	0.5	39	1.1	1.3	1.5	1.3	0.4	2.20	0.030

Table 7-3 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	119	34.0	36.0	37.0	35.5	2.7	94	34.5	36.0	37.5	36.1	2.0	-1.77	0.078
St.Clair	100	34.5	35.5	37.0	35.5	1.8	82	34.0	35.0	37.0	35.2	2.5	0.94	0.351
Maricopa	97	35.5	36.5	38.0	36.5	2.1	58	35.0	36.0	38.0	36.5	2.4	0.12	0.907
Mingo	118	36.5	37.5	39.0	37.6	2.0	106	36.5	38.0	40.0	38.2	2.4	-1.77	0.078
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	118	12.0	12.6	13.3	12.6	1.0	94	12.2	12.8	13.5	12.9	0.9	-2.05	0.042
St.Clair	101	12.0	12.5	13.2	12.6	0.9	81	12.1	12.4	13.1	12.5	1.0	0.58	0.563
Maricopa	96	12.7	13.2	13.6	13.1	0.8	56	12.5	13.0	13.4	13.0	0.7	0.70	0.486
Mingo	115	12.7	13.2	13.8	13.2	0.8	104	12.7	13.3	13.9	13.2	0.9	-0.53	0.594
FEP (MCG/DL)														
Greene/Humphreys	117	14.0	17.0	24.0	18.9	8.4	84	13.0	20.0	23.0	19.3	8.6	-0.29	0.776
St.Clair	101	16.0	19.0	26.0	21.1	8.1	78	15.0	20.0	27.0	22.9	11.1	-1.15	0.251
Maricopa	97	18.0	23.0	28.0	23.5	7.8	58	18.0	22.0	29.0	23.5	7.0	0.03	0.974
Mingo	114	11.0	15.0	21.0	16.5	7.9	101	10.0	14.0	20.0	16.8	9.3	-0.29	0.773
MCHC (%)														
Greene/Humphreys	118	34.4	35.4	36.6	35.5	1.6	94	34.6	35.7	36.8	35.7	1.9	-0.75	0.456
St.Clair	99	34.0	35.5	36.6	35.4	1.9	82	34.3	35.5	36.7	35.5	1.7	-0.40	0.686
Maricopa	95	34.9	35.8	36.5	35.7	1.7	55	35.2	35.6	36.4	35.7	1.7	0.00	0.997
Mingo	113	33.9	34.9	35.9	35.0	1.5	102	34.0	34.7	35.7	34.8	1.4	0.84	0.400

Table 7-3 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	101	308.0	331.0	363.0	334.1	42.8	78	301.0	327.0	354.0	331.0	41.5	0.50	0.620
St.Clair	89	294.0	317.0	343.0	323.8	36.8	73	301.5	318.5	340.5	319.3	31.1	0.84	0.403
Maricopa	87	305.0	340.0	362.0	337.5	42.2	58	300.0	330.0	368.0	338.6	53.9	-0.12	0.901
Mingo	106	288.0	310.0	339.0	315.0	39.0	92	294.0	318.5	345.0	318.3	36.6	-0.62	0.533
SERUM IRON (MCG/DL)														
Greene/Humphreys	108	46.5	61.0	77.0	63.4	23.4	82	53.0	66.0	87.0	68.8	24.3	-1.55	0.124
St.Clair	89	55.0	73.0	92.0	75.6	24.6	75	53.0	67.0	88.0	69.3	24.9	1.60	0.111
Maricopa	92	57.5	72.0	97.0	77.4	27.9	58	66.0	86.0	102.0	85.5	29.6	-1.66	0.100
Mingo	106	48.0	63.5	78.0	65.2	24.5	85	53.0	69.0	87.0	69.9	24.0	-1.35	0.179
TS (%)														
Greene/Humphreys	99	13.6	19.0	23.9	18.9	7.0	78	16.0	21.1	25.2	20.7	6.9	-1.70	0.092
St.Clair	84	18.5	23.5	27.5	23.0	6.6	73	17.1	21.4	26.8	22.1	8.0	0.77	0.441
Maricopa	89	17.0	21.6	26.7	22.6	8.2	57	19.6	26.0	30.4	25.3	8.7	-1.88	0.061
Mingo	101	14.6	19.8	25.4	20.7	7.7	92	16.7	21.0	27.5	21.8	7.6	-0.94	0.349
FERRITIN (NG/DL)														
Greene/Humphreys	95	16.0	22.0	30.0	24.3	11.0	75	17.5	25.0	35.0	26.7	11.9	-1.38	0.169
St.Clair	88	19.5	27.0	35.5	29.8	15.7	75	17.0	26.0	35.0	30.8	36.1	-0.21	0.831
Maricopa	86	14.0	18.0	26.0	21.1	11.0	52	13.5	17.0	23.0	19.6	10.3	0.79	0.429
Mingo	108	15.0	18.0	27.0	22.7	12.1	88	14.0	18.0	28.0	21.3	10.4	0.86	0.392

Table 7-3 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	68	80.5	103.5	129.5	105.2	31.4	60	76.0	88.0	106.0	90.1	24.7	3.04	0.003
Maricopa	87	79.5	98.0	116.5	99.3	27.6	57	71.0	90.0	107.0	90.6	29.7	1.78	0.078
CHULESTEROL (MG/DL)														
Greene/Humphreys	109	144.0	162.0	187.0	166.9	31.9	84	156.5	172.0	188.0	170.8	29.3	-0.87	0.385
St.Clair	100	144.5	165.0	184.0	168.9	32.5	81	149.0	163.0	185.0	169.5	34.8	-0.11	0.909
Maricopa	93	139.0	159.0	182.0	162.8	29.0	58	141.0	153.5	169.0	159.3	30.2	0.71	0.481
Mingo	114	142.0	156.5	170.0	156.3	24.5	100	132.5	155.0	170.5	152.9	29.6	0.89	0.373
VITAMIN A (MCG/DL)														
Greene/Humphreys	67	30.0	36.0	43.0	36.9	10.4	58	32.0	36.5	42.0	37.7	7.7	-0.49	0.623
Maricopa	87	32.0	36.0	39.5	35.8	7.1	56	31.0	35.5	39.5	36.6	7.0	-0.58	0.562
VITAMIN C (MG/DL)														
Maricopa	70	1.2	1.5	1.8	1.5	0.5	39	1.1	1.3	1.5	1.3	0.4	2.20	0.030

Table 7-4

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	102	34.5	36.0	38.0	36.2	2.2	131	35.0	36.5	38.0	36.7	2.5	-1.42	0.158
HEMOGLOBIN (GM/DL)	101	12.2	12.8	13.4	12.8	0.9	129	12.2	12.9	13.6	12.9	1.0	-1.07	0.288
FEP (MCG/DL)	100	12.0	17.0	22.5	18.1	9.1	127	12.0	18.0	22.5	19.0	9.2	-0.73	0.466
MCHC (%)	99	34.2	35.0	36.2	35.2	1.7	128	34.0	35.1	36.1	35.2	1.7	0.08	0.937
TIBC (MCG/DL)	85	294.0	320.0	349.0	323.8	39.5	106	299.0	320.0	349.0	323.8	38.6	0.00	0.996
SERUM IRON (MCG/DL)	86	53.0	68.0	85.0	69.4	23.6	114	50.0	67.5	87.0	68.3	24.9	0.33	0.743
TS (%)	77	16.4	20.3	25.4	20.8	6.4	110	16.1	21.7	26.1	21.2	7.6	-0.31	0.758
FERRITIN (NG/DL)	82	16.0	22.0	29.0	24.6	12.1	105	14.0	23.0	34.0	24.9	14.2	-0.15	0.881
B-CAROTENE (MCG/DL)	19	65.5	108.0	121.0	100.5	34.6	24	83.0	91.0	101.0	93.7	16.8	0.78	0.441
CHOLESTEROL (MG/DL)	93	147.0	164.0	186.0	168.0	29.7	121	147.0	167.0	183.0	165.6	30.3	0.57	0.572
VITAMIN A (MCG/DL)	19	32.5	36.0	44.5	37.9	8.0	24	31.5	36.0	41.0	36.3	6.2	0.70	0.488

Table 7-4 (continued)

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	41	34.0	36.0	37.0	35.8	2.2	42	34.5	36.2	37.0	36.1	2.1	-0.62	0.536
St.Clair	31	34.5	35.0	36.0	35.3	1.8	35	34.0	35.5	37.0	35.4	2.1	-0.29	0.777
Mingo	30	36.5	37.5	39.5	37.8	2.0	54	36.5	38.0	40.0	37.9	2.6	-0.31	0.755
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	41	12.3	12.9	13.3	12.8	0.9	42	12.3	12.8	13.5	12.9	0.9	-0.79	0.432
St.Clair	31	11.8	12.2	12.8	12.4	0.8	34	12.0	12.4	13.0	12.5	1.0	-0.79	0.435
Mingo	29	12.9	13.2	13.7	13.2	0.8	53	12.6	13.2	13.7	13.1	1.0	0.42	0.674
FEP (MCG/DL)														
Greene/Humphreys	40	12.5	17.0	23.0	17.8	8.1	43	12.0	19.0	22.5	18.9	8.4	-0.60	0.550
St.Clair	31	13.5	17.0	25.5	20.1	11.1	33	15.0	19.0	26.0	21.6	10.1	-0.56	0.580
Mingo	29	12.0	15.0	21.0	16.5	7.7	51	10.0	17.0	21.0	17.5	9.2	-0.52	0.608
MCHC (%)														
Greene/Humphreys	41	34.7	35.5	36.5	35.6	1.4	42	34.9	35.7	36.8	35.8	1.7	-0.44	0.661
St.Clair	31	33.8	34.8	36.3	35.0	2.1	35	34.0	35.1	36.0	35.1	1.6	-0.21	0.832
Mingo	27	33.8	34.5	35.3	34.8	1.6	51	33.8	34.7	35.6	34.7	1.6	0.08	0.937
TIBC (MCG/DL)														
Greene/Humphreys	34	309.0	336.0	368.0	333.3	36.9	32	300.0	324.0	348.5	333.0	44.7	0.03	0.979
St.Clair	24	298.5	312.0	344.5	330.1	43.7	29	301.0	322.0	354.0	322.6	37.7	0.66	0.512
Mingo	27	282.5	300.0	325.0	306.2	33.9	45	295.0	318.0	340.0	318.0	33.7	-1.44	0.156

Table 7-4 (continued)

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
SERUM IRON (MCG/DL)														
Greene/Humphreys	35	51.0	63.0	77.5	65.6	22.4	36	44.5	64.5	85.5	66.3	27.5	-0.12	0.902
St.Clair	25	72.0	83.0	94.0	82.7	20.9	31	54.5	66.0	87.0	69.0	23.7	2.28	0.026
Mingo	26	46.0	57.0	72.0	61.9	23.2	47	54.0	70.0	82.0	69.4	24.1	-1.29	0.201
TS (%)														
Greene/Humphreys	33	13.5	19.1	23.7	19.3	6.5	33	14.8	21.3	24.6	19.9	8.4	-0.31	0.756
St.Clair	31	20.8	24.5	25.8	24.2	4.6	30	17.0	21.0	24.6	21.0	7.1	1.89	0.064
Mingo	23	15.5	19.8	24.7	20.0	6.9	47	16.7	22.5	27.7	22.2	7.4	-1.17	0.249
FERRITIN (NG/DL)														
Greene/Humphreys	31	17.5	22.0	26.5	23.7	11.4	31	20.0	26.0	37.5	29.2	12.7	-1.81	0.076
St.Clair	24	16.5	27.0	39.5	27.4	12.7	30	16.0	25.0	36.0	28.0	17.6	-0.13	0.895
Mingo	27	16.0	21.0	26.0	23.3	12.2	44	12.5	15.5	28.0	19.8	10.8	1.21	0.232
B-CAROTENE (MCG/DL)														
Greene/Humphreys	19	65.5	108.0	121.0	100.5	34.6	24	83.0	91.0	101.0	93.7	16.8	0.78	0.441
CHOLESTEROL (MG/DL)														
Greene/Humphreys	34	147.0	170.5	191.0	172.0	34.2	36	154.5	175.0	189.5	174.2	29.3	-0.29	0.775
St.Clair	30	152.0	173.0	190.0	174.1	27.3	34	156.0	172.0	183.0	169.0	32.3	0.68	0.496
Mingo	29	145.0	157.0	168.0	156.9	23.8	51	138.5	165.0	172.5	157.4	27.9	-0.07	0.941
VITAMIN A (MCG/DL)														
Greene/Humphreys	19	32.5	36.0	44.5	37.9	8.0	24	31.5	36.0	41.0	36.3	6.2	0.70	0.488

Table 7-5

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	332	35.0	36.0	38.0	36.3	2.4	209	35.0	36.5	38.0	36.5	2.6	-0.84	0.402
HEMOGLOBIN (GM/DL)	329	12.3	13.0	13.5	12.9	0.9	206	12.3	12.9	13.5	12.9	0.9	-0.53	0.599
FEP (MCG/DL)	329	14.0	19.0	25.0	20.4	8.5	204	14.0	20.0	27.0	20.8	9.7	-0.55	0.586
MCHC (%)	326	34.4	35.5	36.4	35.4	1.7	205	34.3	35.6	36.4	35.5	1.8	-0.34	0.731
TIBC (MCG/DL)	298	297.0	328.5	355.0	328.1	41.6	194	297.0	324.5	353.0	326.8	42.7	0.34	0.732
SERUM IRON (MCG/DL)	309	51.0	67.0	87.0	70.0	26.3	196	57.0	69.0	93.5	74.7	26.5	-1.95	0.051
TS (%)	296	15.7	20.1	26.2	21.3	7.8	190	17.4	21.4	28.3	22.9	8.0	-2.13	0.034
FERRITIN (NG/DL)	292	15.0	21.5	30.0	24.3	13.2	186	15.0	21.0	30.0	24.8	24.0	-0.24	0.814
B-CAROTENE (MCG/DL)	136	81.0	102.0	121.0	102.1	28.7	93	68.0	88.0	107.0	89.5	29.2	3.24	0.001
CHOLESTEROL (MG/DL)	323	141.0	158.0	180.0	162.3	29.8	202	141.0	157.5	180.0	161.2	32.7	0.39	0.700
VITAMIN A (MCG/DL)	135	30.5	35.0	41.0	36.1	8.8	90	33.0	36.0	42.0	37.4	7.7	-1.15	0.252
VITAMIN C (MG/DL)	70	1.2	1.5	1.8	1.5	0.5	39	1.1	1.3	1.5	1.3	0.4	2.20	0.030

Table 7-5 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	78	34.0	36.0	37.0	35.3	3.0	52	34.5	35.5	37.8	36.0	2.1	-1.62	0.107
St.Clair	69	34.5	36.0	37.0	35.6	1.8	47	34.0	35.0	37.0	35.0	2.8	1.25	0.215
Maricopa	97	35.5	36.5	38.0	36.5	2.1	58	35.0	36.0	38.0	36.5	2.4	0.12	0.907
Mingo	88	36.4	37.5	39.0	37.6	2.1	52	37.0	38.5	39.5	38.4	2.1	-2.22	0.028
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	77	11.9	12.5	13.3	12.5	1.1	52	12.1	12.8	13.5	12.8	0.9	-1.80	0.075
St.Clair	70	12.1	12.5	13.3	12.7	1.0	47	12.1	12.5	13.3	12.5	1.0	1.04	0.303
Maricopa	96	12.7	13.2	13.6	13.1	0.8	56	12.5	13.0	13.4	13.0	0.7	0.70	0.486
Mingo	86	12.7	13.2	13.8	13.2	0.8	51	12.7	13.3	14.0	13.4	0.7	-1.50	0.136
FEP (MCG/DL)														
Greene/Humphreys	77	14.0	18.0	24.0	19.5	8.6	51	14.0	20.0	23.5	19.6	8.8	-0.05	0.959
St.Clair	70	16.0	20.0	26.0	21.6	8.1	45	15.0	21.0	30.0	23.9	11.6	-1.15	0.253
Maricopa	97	18.0	23.0	28.0	23.5	7.8	58	18.0	22.0	29.0	23.5	7.0	0.03	0.974
Mingo	85	11.0	15.0	21.0	16.5	9.0	50	9.0	13.0	20.0	16.2	9.5	0.21	0.834
MCHC (%)														
Greene/Humphreys	77	34.4	35.3	36.6	35.4	1.7	52	34.1	35.8	36.8	35.6	2.1	-0.52	0.605
St.Clair	68	34.1	35.6	36.6	35.6	1.8	47	34.4	35.8	37.1	35.8	1.8	-0.66	0.513
Maricopa	95	34.9	35.8	36.5	35.7	1.7	55	35.2	35.6	36.4	35.7	1.7	0.00	0.997
Mingo	86	33.9	35.1	36.0	35.0	1.4	51	24.0	34.7	35.7	34.8	1.3	0.77	0.443

Table 7-5 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	67	307.0	330.0	361.0	334.5	45.7	46	303.0	328.5	357.0	329.5	39.5	0.62	0.537
St.Clair	65	291.0	326.0	341.0	321.4	34.0	43	302.0	313.0	333.5	317.0	26.0	0.76	0.449
Maricopa	87	305.0	340.0	362.0	337.5	42.2	58	300.0	330.0	368.0	338.6	53.9	-0.12	0.901
Mingo	79	290.0	310.0	342.0	318.0	40.3	47	291.5	319.0	346.0	318.6	39.5	-0.09	0.929
SERUM IRON (MCG/DL)														
Greene/Humphreys	73	44.0	59.0	76.0	62.3	33.9	46	57.0	66.0	87.0	70.7	21.5	-1.99	0.049
St.Clair	64	54.0	69.0	91.5	72.0	28.4	44	46.0	71.0	90.0	69.5	26.0	0.64	0.523
Maricopa	92	57.5	72.0	97.0	77.4	27.9	58	66.0	86.0	102.0	85.9	29.6	-1.66	0.100
Mingo	80	48.5	65.0	79.5	66.3	25.0	48	53.0	67.0	88.0	70.4	24.2	-0.90	0.370
TS (%)														
Greene/Humphreys	66	13.6	17.5	23.9	18.7	7.3	45	17.0	21.1	25.5	21.3	5.6	-2.10	0.038
St.Clair	63	16.0	21.5	27.5	22.6	7.1	43	17.2	23.5	28.8	22.9	8.6	-0.13	0.897
Maricopa	89	17.0	21.6	26.7	22.6	8.2	57	19.6	26.0	30.4	25.3	8.7	-1.89	0.061
Mingo	78	14.3	19.8	26.0	20.9	8.0	45	17.2	19.9	26.9	21.4	7.9	-0.30	0.767
FERRITIN (NG/DL)														
Greene/Humphreys	64	15.5	23.0	32.0	24.6	10.8	44	15.5	24.5	31.0	25.0	11.2	-0.19	0.848
St.Clair	64	20.0	27.0	35.0	30.7	16.7	45	19.0	26.0	32.0	32.6	44.5	-0.28	0.783
Maricopa	86	14.0	19.0	26.0	21.1	11.0	52	13.5	17.0	23.0	19.6	10.3	0.79	0.429
Mingo	78	15.0	19.0	27.0	22.4	12.3	45	19.0	20.0	28.0	22.7	10.0	-0.11	0.910

Table 7-5 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	49	82.0	103.0	132.0	107.0	30.3	36	64.0	83.0	107.0	87.7	28.8	2.99	0.004
Maricopa	87	79.5	98.0	116.5	99.3	27.6	57	71.0	90.0	107.0	90.6	29.7	1.78	0.078
CHOLESTEROL (MG/DL)														
Greene/Humphreys	75	142.0	162.0	183.5	164.6	30.8	48	156.5	169.5	185.0	168.2	29.3	-0.65	0.518
St.Clair	70	143.0	160.5	183.0	166.6	34.5	47	146.5	158.0	190.0	169.8	36.8	-0.46	0.643
Maricopa	93	139.0	159.0	182.0	162.8	29.0	58	141.0	153.5	169.0	159.3	30.2	0.71	0.481
Mingo	85	142.0	156.0	170.0	156.0	24.8	49	130.0	147.0	163.0	148.3	30.9	1.50	0.138
VITAMIN A (MCG/DL)														
Greene/Humphreys	48	29.0	33.5	43.0	36.6	11.3	34	34.0	38.0	44.0	38.7	8.6	-0.99	0.326
Maricopa	87	32.0	36.0	39.5	35.8	7.1	56	31.0	35.5	39.5	36.6	7.0	-0.58	0.562
VITAMIN C (MG/DL)														
Maricopa	70	1.2	1.5	1.8	1.5	0.5	39	1.1	1.3	1.5	1.3	0.4	2.20	0.030

Table 7-6

BIOCHEMICAL INDICATORS FOR MALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	222	35.0	36.5	38.0	36.4	2.3	170	35.0	36.5	38.0	36.5	2.6	-0.34	0.730
HEMOGLOBIN (GM/DL)	220	12.3	12.9	13.5	12.8	0.9	168	12.3	12.9	13.5	12.9	1.0	-0.78	0.434
FEP (MCG/DL)	218	14.0	18.0	24.0	20.0	8.1	166	14.0	19.0	24.0	20.0	9.1	-0.02	0.982
MCHC (%)	217	34.2	35.3	36.3	35.3	1.6	167	34.8	35.7	36.5	35.5	1.7	-1.42	0.156
TIBC (MCG/DL)	189	287.0	328.0	352.5	327.6	41.5	148	302.5	329.0	350.5	329.5	41.6	-0.42	0.673
SERUM IRON (MCG/DL)	203	53.0	66.0	84.5	70.0	25.9	154	54.0	67.5	88.0	71.6	24.7	-0.60	0.548
TS (%)	193	15.7	20.1	25.7	21.3	7.7	132	16.8	21.3	26.9	22.0	7.5	-0.82	0.414
FERRITIN (NG/DL)	188	15.0	20.0	28.0	23.3	12.5	145	14.0	21.0	29.0	24.2	26.7	-0.39	0.698
B-CAROTENE (MCG/DL)	79	75.0	102.0	124.0	100.9	32.3	59	74.0	93.0	109.0	93.2	26.0	1.56	0.121
CHOLESTEROL (MG/DL)	217	143.0	160.0	182.0	163.3	29.1	160	144.0	164.5	183.0	164.3	32.6	-0.32	0.751
VITAMIN A (MCG/DL)	79	31.0	36.0	42.0	36.9	9.1	58	32.0	36.0	42.0	37.2	7.8	-0.24	0.811
VITAMIN C (MG/DL)	40	1.3	1.5	1.8	1.5	0.5	15	1.0	1.3	1.5	1.2	0.4	-2.30	0.029

Table 7-6 (continued)

BIOCHEMICAL INDICATORS FOR MALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	53	34.0	35.0	37.0	35.5	2.4	54	34.5	36.0	37.0	35.8	1.9	-0.85	0.398
St.Clair	53	34.5	35.0	36.5	35.3	1.8	43	34.0	35.5	37.0	35.2	3.0	0.19	0.852
Maricopa	53	35.5	36.8	38.0	36.4	2.0	22	35.0	36.5	37.0	36.5	2.0	0.54	0.589
Mingo	64	36.5	37.5	39.0	37.7	2.1	51	36.5	38.0	40.0	38.2	2.3	-1.23	0.222
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	52	12.0	12.6	13.2	12.6	0.9	54	12.2	12.8	13.3	12.8	0.9	-1.25	0.215
St.Clair	54	11.8	12.4	13.1	12.6	1.0	42	12.1	12.6	13.3	12.7	1.1	-0.55	0.587
Maricopa	53	12.9	13.2	13.6	13.2	0.7	21	12.7	13.0	13.5	13.1	0.8	0.52	0.606
Mingo	62	12.7	13.2	13.7	13.1	0.7	51	12.6	13.3	14.0	13.3	0.9	-0.89	0.377
FEP (MCG/DL)														
Greene/Humphreys	52	15.0	18.0	24.0	20.3	8.5	54	12.0	18.0	22.0	18.4	9.0	1.11	0.270
St.Clair	54	15.0	20.0	27.0	21.4	9.1	41	16.0	19.0	27.0	22.6	10.3	-0.58	0.561
Maricopa	52	18.5	22.0	26.0	22.6	6.9	22	19.0	25.0	30.0	24.1	6.7	-0.90	0.376
Mingo	60	11.0	15.0	21.0	16.1	6.2	49	12.0	15.0	21.0	17.6	8.3	-1.10	0.275
MCHC (%)														
Greene/Humphreys	52	34.6	35.2	36.5	35.4	1.5	54	34.7	36.0	36.9	35.7	1.8	-0.90	0.368
St.Clair	52	34.0	35.4	36.3	35.3	2.0	43	34.7	36.0	36.7	35.8	1.6	-1.33	0.187
Maricopa	51	34.8	35.9	36.7	35.7	1.5	31	35.1	35.9	36.8	35.9	1.4	-0.54	0.590
Mingo	62	33.8	34.8	35.6	34.7	1.3	49	34.0	34.8	35.9	34.9	1.5	-0.44	0.659

Table 7-6 (continued)

BIOCHEMICAL INDICATORS FOR MALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	47	306.0	333.0	361.0	329.1	41.3	47	302.5	332.0	356.0	334.8	42.6	-0.66	0.511
St.Clair	46	301.0	330.0	345.0	326.7	37.6	38	300.5	310.0	334.0	315.6	31.9	1.42	0.156
Maricopa	46	313.0	342.5	369.0	339.4	42.9	22	307.0	343.5	381.0	348.4	57.0	-0.66	0.516
Mingo	60	285.5	310.0	341.5	318.0	41.6	44	302.0	329.0	346.0	325.3	34.7	-0.98	0.328
SERUM IRON (MCG/DL)														
Greene/Humphreys	50	46.0	60.0	72.0	62.7	24.7	47	57.5	67.0	87.0	72.2	22.4	-1.98	0.050
St.Clair	45	55.0	71.0	90.0	74.3	25.0	39	44.0	60.0	85.0	65.7	25.4	1.56	0.122
Maricopa	48	59.5	72.0	100.0	78.7	29.1	22	63.0	84.0	99.0	82.1	29.0	-0.46	0.647
Mingo	60	51.0	66.5	75.5	65.8	22.5	46	53.0	66.5	88.0	70.9	23.2	-1.14	0.258
TS (%)														
Greene/Humphreys	45	13.6	17.7	22.3	18.6	6.8	46	15.6	21.2	25.2	21.5	6.3	-2.07	0.041
St.Clair	42	17.8	22.8	26.4	22.8	6.7	33	16.0	20.7	26.3	21.6	8.4	0.73	0.467
Maricopa	47	17.9	22.0	26.9	23.2	8.8	22	19.0	24.6	27.2	23.6	8.0	-0.20	0.845
Mingo	59	15.1	19.8	24.9	20.7	7.5	46	16.6	20.5	26.04	22.0	7.6	-0.85	0.399
FERRITIN (NG/DL)														
Greene/Humphreys	46	16.0	22.5	30.0	24.3	10.7	45	16.0	23.0	32.0	25.1	11.6	-0.34	0.732
St.Clair	46	18.0	26.5	35.0	28.8	16.1	38	16.0	24.5	35.0	33.3	48.6	-0.54	0.593
Maricopa	47	13.5	19.0	27.0	21.8	12.0	15	10.5	15.0	19.0	16.7	8.6	1.96	0.056
Mingo	59	14.0	18.0	23.5	19.3	9.3	43	13.5	17.0	23.5	18.6	7.6	0.43	0.670

Table 7-6 (continued)

BIOCHEMICAL INDICATORS FOR MALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	32	75.0	102.5	130.0	104.6	34.8	27	78.0	93.0	107.0	92.6	24.0	1.64	0.107
Maricopa	47	78.0	102.0	115.0	98.5	30.5	22	71.0	91.5	112.0	94.2	29.7	0.55	0.587
CHOLESTEROL (MG/DL)														
Greene/Humphreys	51	152.0	170.0	188.5	171.9	29.7	48	155.5	172.5	188.0	169.4	30.5	0.41	0.683
St.Clair	54	141.0	156.0	183.0	164.1	33.5	42	143.0	160.0	183.0	168.7	40.2	-0.59	0.554
Maricopa	50	146.0	159.5	176.0	161.3	25.9	22	148.0	164.5	182.0	165.3	30.4	-0.53	0.600
Mingo	62	141.0	158.0	173.0	157.2	25.6	46	133.5	150.0	172.5	155.1	26.6	0.42	0.678
VITAMIN A (MCG/DL)														
Greene/Humphreys	32	29.0	36.0	43.0	37.3	11.8	36	32.0	35.5	42.0	37.6	8.4	-0.11	0.915
Maricopa	47	32.5	36.0	40.0	36.6	6.8	22	31.0	36.0	40.0	36.6	6.7	-0.02	0.983
VITAMIN C (MG/DL)														
Maricopa	40	1.2	1.5	1.8	1.6	0.5	15	1.0	1.3	1.6	1.2	0.4	2.30	0.029

Table 7-7

BIOCHEMICAL INDICATORS FOR FEMALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	212	35.0	36.0	38.0	36.3	2.8	170	35.0	36.8	38.0	36.7	2.6	-1.76	0.079
HEMOGLOBIN (GM/DL)	210	12.3	12.9	13.5	12.9	0.9	167	12.3	12.9	13.5	12.9	0.9	-0.41	0.685
FEP (MCG/DL)	211	13.0	18.0	25.0	19.7	8.3	165	13.0	18.0	25.0	20.3	10.0	-0.55	0.582
MCHC (%)	208	34.4	35.6	36.4	35.5	1.8	166	34.1	35.1	36.1	35.2	1.9	1.44	0.151
TIBC (MCG/DL)	184	297.5	323.0	354.5	326.8	40.9	152	295.0	317.0	350.0	322.1	40.7	1.04	0.300
SERUM IRON (MCG/DL)	192	50.0	68.0	88.0	68.8	25.6	156	55.0	68.5	83.5	73.1	27.4	-1.16	0.248
TS (%)	180	15.9	20.4	25.7	21.1	7.9	148	17.0	21.8	26.2	22.5	8.3	-1.62	0.107
FERRITIN (NG/DL)	176	16.0	23.0	32.0	25.6	13.2	146	16.0	22.5	33.0	25.5	13.0	0.13	0.894
B-CAROTENE (MCG/DL)	76	81.5	103.5	118.0	102.8	26.2	56	69.0	87.0	103.0	87.4	28.2	3.25	0.002
CHOLESTEROL (MG/DL)	198	142.5	158.0	183.0	163.6	30.7	163	140.0	161.0	180.0	161.4	31.0	0.74	0.458
VITAMIN A (MCG/DL)	75	30.0	35.0	41.0	35.8	8.2	56	31.5	36.0	42.5	37.1	7.0	-1.01	0.316
VITAMIN C (MG/DL)	30	1.0	1.5	1.8	1.4	0.5	24	1.1	1.3	1.5	1.4	0.3	0.64	0.525

Table 7-7 (continued)

BIOCHEMICAL INDICATORS FOR FEMALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	66	34.0	36.0	37.0	35.5	3.0	40	35.0	36.0	38.0	36.4	2.2	-1.76	0.082
St.Clair	47	34.5	35.5	37.2	35.7	1.8	39	34.0	35.0	36.8	35.2	1.9	1.37	0.173
Maricopa	45	35.5	36.0	38.0	36.2	2.3	36	35.0	36.0	38.0	36.5	2.6	-0.43	0.667
Mingo	54	36.0	37.5	38.5	37.6	2.0	65	37.0	38.0	38.5	38.1	2.5	-1.30	0.195
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	66	11.9	12.6	13.4	12.6	1.1	40	12.2	12.8	13.8	13.0	0.9	-1.75	0.083
St.Clair	47	12.1	12.6	13.2	12.7	0.8	39	11.8	12.3	12.8	12.4	0.8	1.70	0.093
Maricopa	44	12.6	13.0	13.6	13.0	0.8	35	12.5	13.0	13.4	13.0	0.7	0.18	0.860
Mingo	53	12.6	13.2	13.9	13.2	0.8	53	12.7	13.3	13.7	13.2	0.9	0.14	0.893
FEP (MCG/DL)														
Greene/Humphreys	65	12.0	17.0	22.0	17.8	8.2	40	13.5	21.0	24.0	20.4	8.0	-1.58	0.117
St.Clair	47	16.0	19.0	25.0	20.8	9.2	37	15.0	20.0	27.0	23.2	12.0	-1.03	0.306
Maricopa	45	18.0	24.0	31.0	24.6	8.7	36	17.0	22.0	26.5	23.1	7.3	0.85	0.401
Mingo	54	11.0	15.0	21.0	17.0	9.4	53	8.5	13.0	18.5	16.1	10.2	0.46	0.643
MCHC (%)														
Greene/Humphreys	66	34.2	35.0	36.6	35.6	1.7	40	34.37	35.5	36.8	35.6	2.0	-0.19	0.848
St.Clair	47	34.3	35.6	36.8	35.5	1.8	39	33.9	34.9	35.9	35.2	1.8	0.81	0.422
Maricopa	44	35.0	35.7	36.3	35.7	2.0	34	35.3	35.5	36.1	35.6	1.9	0.27	0.781
Mingo	51	34.2	35.2	36.1	35.2	1.6	53	34.0	34.4	35.6	34.7	1.4	1.69	0.095

Table 7-7 (continued)

BIOCHEMICAL INDICATORS FOR FEMALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	54	312.0	330.0	368.0	338.5	44.0	31	298.0	321.0	346.0	325.2	39.7	1.43	0.157
St.Clair	43	292.5	311.0	339.0	320.6	36.2	37	302.0	328.0	346.0	322.7	30.4	-0.29	0.776
Maricopa	41	300.0	339.0	362.0	335.4	41.8	36	298.5	313.0	361.0	332.5	51.9	0.26	0.794
Mingo	46	289.0	308.0	339.0	311.1	35.0	48	287.5	313.5	340.0	311.9	37.5	-0.11	0.914
SERUM IRON (MCG/DL)														
Greene/Humphreys	58	45.0	63.0	79.0	64.0	22.4	35	49.0	62.0	84.5	64.2	26.2	-0.04	0.965
St.Clair	44	57.0	81.5	93.0	76.9	24.3	36	56.0	71.0	90.5	73.3	24.2	0.66	0.513
Maricopa	44	52.5	72.0	94.5	76.0	26.7	36	66.5	90.5	107.0	87.5	30.1	-1.78	0.079
Mingo	46	47.0	60.5	79.0	64.5	27.3	49	55.0	69.0	86.0	68.9	25.0	-0.81	0.417
TS (%)														
Greene/Humphreys	54	13.5	19.1	24.0	19.1	7.2	32	15.2	20.6	25.2	19.5	7.6	-0.24	0.814
St.Clair	42	19.0	23.5	27.6	23.2	6.5	35	17.7	22.5	25.5	22.7	7.7	0.32	0.748
Maricopa	42	16.1	20.4	26.5	21.9	7.6	35	19.7	28.2	32.6	26.4	9.1	-2.33	0.023
Mingo	42	14.5	19.6	27.4	20.8	8.2	46	17.9	21.2	26.9	21.6	7.8	-0.48	0.634
FERRITIN (NG/DL)														
Greene/Humphreys	49	16.0	22.0	30.0	24.3	11.3	30	20.0	28.0	38.0	29.2	12.1	-1.80	0.076
St.Clair	42	22.0	27.0	37.0	30.8	15.5	37	17.0	27.0	35.0	28.1	15.3	0.77	0.443
Maricopa	39	14.5	18.0	25.0	20.3	8.8	33	15.0	19.0	23.0	21.4	10.9	-0.44	0.663
Mingo	46	17.0	25.0	32.0	26.9	14.0	46	14.0	20.5	34.0	23.8	12.0	1.17	0.246

Table 7-7 (continued)

BIOCHEMICAL INDICATORS FOR FEMALES WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	36	84.0	104.5	129.5	105.8	28.5	23	69.0	83.0	87.5	86.1	26.0	2.73	0.009
Maricopa	40	79.5	96.0	116.5	100.4	24.2	35	69.5	88.0	106.0	88.3	29.8	1.91	0.061
CHOLESTEROL (MG/DL)														
Greene/Humphreys	58	139.0	155.0	184.0	162.5	33.4	36	159.0	171.0	185.0	172.6	27.9	-1.57	0.120
St.Clair	46	152.0	169.0	190.0	174.5	30.7	39	153.0	164.0	187.0	170.3	28.2	0.65	0.515
Maricopa	43	137.5	159.0	187.5	164.6	32.4	36	138.0	147.0	164.5	155.7	29.9	1.27	0.209
Mingo	52	142.0	148.5	165.0	155.2	23.3	52	131.5	156.5	167.0	151.0	32.2	0.77	0.442
VITAMIN A (MCG/DL)														
Greene/Humphreys	35	30.0	36.0	44.5	36.6	9.1	22	32.0	39.0	44.0	38.0	6.6	-0.67	0.505
Maricopa	40	30.5	35.0	39.0	35.0	7.5	34	31.0	35.0	38.0	36.5	7.4	-0.87	0.387
VITAMIN C (MG/DL)														
Maricopa	30	1.0	1.5	1.8	1.4	0.5	24	1.2	1.3	1.5	1.4	0.3	0.64	0.525

Table 7-8

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
White	151	36.0	37.5	39.0	37.3	2.2	134	36.5	38.0	39.5	37.9	2.3	-2.01	0.046
Black	219	34.0	36.0	37.0	35.6	2.4	160	34.0	35.5	37.0	35.5	2.3	0.24	0.808
Hispanic	64	35.5	36.0	38.0	36.4	1.9	46	35.0	36.3	37.0	36.5	2.5	-0.26	0.797
HEMOGLOBIN (GM/DL)														
White	148	12.6	13.2	13.7	13.1	0.8	132	12.7	13.3	13.9	13.3	0.8	-1.16	0.248
Black	219	12.0	12.5	13.3	12.6	1.0	159	12.0	12.5	13.3	12.6	0.9	-0.09	0.925
Hispanic	63	12.8	13.2	13.6	13.1	0.7	44	12.6	13.0	13.4	13.0	0.8	0.57	0.568
FEP (MCG/DL)														
White	147	12.0	17.0	21.5	17.1	7.0	128	11.0	17.0	21.0	17.7	9.0	-0.58	0.565
Black	218	14.0	18.0	25.0	20.1	9.1	157	14.0	20.0	25.0	21.1	10.2	-1.04	0.301
Hispanic	64	19.0	25.0	30.0	25.3	7.9	46	19.0	22.0	30.0	23.1	7.1	1.28	0.205
MCHC (%)														
White	146	33.9	35.2	36.1	35.1	1.5	130	34.0	34.9	36.0	35.1	1.6	0.13	0.895
Black	216	34.2	35.4	36.5	35.4	1.7	159	34.3	35.5	36.6	35.5	1.8	-0.41	0.685
Hispanic	63	35.3	35.9	36.6	36.0	1.8	44	35.3	35.7	36.7	35.9	1.8	0.29	0.774
TIBC (MCG/DL)														
White	133	290.0	312.0	343.0	318.9	40.7	117	293.0	319.0	347.0	319.6	39.2	-0.12	0.901
Black	192	299.0	328.5	349.5	327.5	40.2	137	301.0	322.0	347.0	324.9	36.8	0.61	0.545
Hispanic	58	320.0	347.0	377.0	344.9	40.1	46	307.0	331.5	360.0	343.9	53.1	0.11	0.914
SERUM IRON (MCG/DL)														
White	137	51.0	64.0	81.0	67.8	24.7	124	53.5	69.0	88.0	71.1	24.0	-1.10	0.271
Black	199	51.5	67.0	87.0	69.2	25.4	140	54.0	66.5	87.0	69.0	24.8	0.04	0.965
Hispanic	59	58.0	72.0	96.5	77.4	28.0	46	66.0	90.0	102.0	86.0	31.2	-1.47	0.145

Table 7-8 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
White	130	15.5	19.4	25.2	20.8	7.7	117	17.2	21.3	26.9	21.9	7.1	-1.20	0.231
Black	183	15.6	20.3	25.6	20.9	7.2	137	16.4	21.1	25.7	21.5	7.7	-0.64	0.519
Hispanic	60	17.6	22.9	26.9	23.0	8.4	46	19.0	26.2	32.0	25.4	9.5	-1.37	0.173
FERRITIN (NG/DL)														
White	131	15.0	19.0	27.0	21.8	11.3	112	14.0	19.0	28.0	21.7	10.5	0.11	0.911
Black	184	18.0	25.0	34.0	27.6	14.0	138	17.0	26.0	35.0	29.1	27.8	-0.59	0.558
Hispanic	59	14.0	18.0	24.0	20.0	10.1	41	13.0	16.0	22.0	19.0	10.6	0.49	0.625
B-CAROTENE (MCG/DL)														
White	38	78.0	101.5	119.0	97.8	27.3	22	63.0	84.5	106.0	88.0	31.6	1.20	0.236
Black	59	80.5	103.0	128.5	104.6	32.6	51	76.0	88.0	103.0	88.4	21.3	3.12	0.002
Hispanic	58	82.0	102.0	117.0	101.9	27.3	44	71.0	92.5	110.5	93.8	30.8	1.38	0.170
CHOLESTEROL (MG/DL)														
White	144	142.0	157.5	172.0	157.8	24.8	128	136.0	155.0	175.5	155.1	29.7	0.83	0.406
Black	211	145.0	164.0	187.5	168.0	32.3	149	150.0	169.0	186.0	169.6	32.7	-0.46	0.649
Hispanic	61	139.0	158.0	176.0	161.6	30.6	46	141.0	158.5	171.0	162.6	30.1	-0.17	0.867
VITAMIN A (MCG/DL)														
White	37	33.0	36.0	39.0	36.1	5.7	21	34.0	36.0	43.0	38.4	6.2	-1.36	0.181
Black	58	30.0	35.5	43.0	37.0	10.7	49	32.0	37.0	42.0	37.7	8.1	-0.40	0.688
Hispanic	59	31.0	35.0	41.0	35.8	8.0	44	31.0	35.0	39.0	35.9	7.0	-0.10	0.919
VITAMIN C (MG/DL)														
White	20	1.3	1.5	1.8	1.6	0.5	9	1.2	1.3	1.5	1.4	0.3	1.84	0.077
Black	5	1.2	1.5	1.6	1.4	0.7	1	-----	1.1	-----	1.1	-----	1.10	0.339
Hispanic	45	1.1	1.5	1.8	1.4	0.5	29	1.0	1.3	1.6	1.3	0.4	1.37	0.177

Table 7-8 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY BY SITE

		HEAD START						NON-HEAD START							
		N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)															
Greene/Humphreys	White	17	35.0	36.0	37.0	36.2	2.2	18	35.0	36.8	38.5	36.9	2.1	-1.01	0.322
	Black	100	34.0	35.8	37.0	35.4	2.8	76	34.5	35.5	37.0	35.9	2.0	-1.31	0.191
St.Clair	Black	100	34.5	35.5	37.0	35.5	1.8	79	34.0	35.0	37.0	35.3	2.0	0.66	0.509
Maricopa	White	27	34.8	36.5	38.0	36.5	2.4	11	35.0	38.0	38.0	37.0	1.8	-0.64	0.525
	Black	6	38.0	38.3	40.0	38.0	2.7	2	-----	-----	-----	33.5	0.7	3.76	0.009
	Hispanic	64	35.5	36.0	38.0	36.4	1.9	45	35.0	36.0	37.0	36.5	2.5	-0.23	0.819
Mingo	White	107	36.5	37.5	39.3	37.7	2.0	105	36.5	38.0	39.5	38.1	2.4	-1.35	0.177
	Black	11	35.8	37.0	37.8	36.7	2.0	1	-----	40.5	-----	40.5	-----	-6.28	0.000
HEMOGLOBIN (GM/DL)															
Greene/Humphreys	White	17	12.3	12.6	13.3	12.8	0.8	18	12.9	13.8	14.2	13.5	0.8	-2.63	0.013
	Black	99	11.9	12.6	13.3	12.6	1.0	76	12.0	12.7	13.3	12.7	0.9	-1.01	0.312
St.Clair	Black	101	12.0	12.5	13.2	12.6	0.9	78	12.1	12.4	13.1	12.6	0.9	0.24	0.807
Maricopa	White	27	12.8	13.1	13.6	13.1	0.6	11	12.6	13.0	13.4	13.0	0.5	0.32	0.750
	Black	6	12.6	12.8	13.5	12.8	0.9	2	-----	-----	-----	11.9	0.3	2.01	0.091
	Hispanic	63	12.8	13.2	13.6	13.1	0.7	43	12.6	13.0	13.4	13.1	0.6	0.50	0.620
Mingo	White	104	12.7	13.3	13.8	13.2	0.7	103	12.7	13.3	13.9	13.2	0.9	-0.16	0.870
	Black	11	12.4	13.1	13.2	12.9	1.0	1	-----	14.1	-----	14.1	-----	-4.06	0.002
FEP (MCG/DL)															
Greene/Humphreys	White	17	13.0	20.0	24.0	19.3	8.2	17	14.0	19.0	20.0	18.4	6.8	0.36	0.719
	Black	98	14.0	17.0	24.0	18.7	8.4	77	13.0	20.0	24.0	19.5	9.0	-0.56	0.576
St.Clair	Black	101	16.0	19.0	26.0	21.1	9.1	75	15.0	20.0	27.0	22.7	11.1	-1.03	0.307
Maricopa	White	27	17.5	19.0	22.5	20.1	4.6	11	18.0	22.0	28.5	23.8	6.9	-1.64	0.123
	Black	6	11.0	14.5	28.0	20.0	12.3	2	-----	-----	-----	20.0	9.9	0.00	0.000
	Hispanic	64	19.0	25.0	30.0	25.3	7.9	45	19.0	22.0	30.0	23.5	7.1	1.20	0.234
Mingo	White	103	11.0	15.0	20.0	16.0	7.1	100	10.0	14.5	20.5	16.9	9.3	-0.79	0.431
	Black	11	10.5	17.0	29.0	21.2	12.5	1	-----	9.0	-----	9.0	-----	3.22	0.009

Table 7-8 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MCHC (%)														
Greene/Humphreys														
White	17	34.5	35.3	36.6	35.4	1.5	18	35.6	36.5	37.0	36.7	1.7	-2.40	0.022
Black	99	34.4	35.4	36.5	35.5	1.6	76	34.2	35.5	36.6	35.4	1.6	0.20	0.845
St.Clair														
Black	89	34.0	35.5	36.6	35.4	1.6	70	34.3	35.6	36.6	35.5	1.6	-0.44	0.664
Maricopa														
White	26	34.8	35.8	36.7	35.7	1.4	11	34.0	35.3	35.7	35.2	0.8	1.32	0.196
Black	6	33.2	33.5	34.0	33.6	0.6	1	-----	34.4	-----	34.4	-----	-3.37	0.020
Hispanic	63	35.3	35.9	36.6	36.0	1.6	43	35.3	35.8	36.7	35.9	1.6	0.17	0.867
Mingo														
White	103	33.9	34.9	35.8	34.9	1.5	101	33.9	34.7	35.7	34.8	1.4	0.63	0.528
Black	10	34.5	34.9	35.9	35.3	1.1	1	-----	34.8	-----	34.8	-----	1.52	0.162
TIBC (MCG/DL)														
Greene/Humphreys														
White	14	311.0	335.0	361.0	337.3	29.8	15	301.5	337.0	354.5	326.3	39.5	0.85	0.406
Black	85	306.0	330.0	363.0	333.9	44.4	63	301.5	325.0	353.0	332.1	42.1	0.25	0.803
St.Clair														
Black	89	294.0	317.0	343.0	323.6	36.8	70	301.0	318.5	337.0	318.6	31.1	0.95	0.343
Maricopa														
White	24	297.0	316.5	355.0	323.0	46.8	11	282.5	316.0	361.0	321.9	56.0	0.07	0.944
Black	5	305.0	317.0	340.0	321.6	19.0	2	-----	-----	-----	323.5	33.2	-0.06	0.952
Hispanic	58	320.0	347.0	377.0	344.9	40.1	45	307.0	330.0	380.0	343.4	53.6	0.16	0.874
Mingo														
White	95	287.5	31u.0	339.0	315.2	40.0	91	294.0	319.0	345.0	318.2	36.8	-0 53	0.595
Black	11	292.5	297.0	331.5	312.9	30.2	1	-----	329.0	-----	329.0	-----	-1.77	0.107
SERUM IRON (MCG/DL)														
Greene/Humphreys														
White	14	54.0	60.0	81.0	65.7	22.8	18	53.0	72.0	91.0	72.3	20.9	-0.84	0.411
Black	92	44.5	62.5	77.0	63.3	23.7	64	51.5	64.5	35.5	67.8	25.2	-1.12	0.267
St.Clair														
Black	89	55.0	73.0	92.0	75.6	24.6	72	53.0	67.0	88.5	69.5	25.0	1.55	0.123
Maricopa														
White	27	57.5	67.0	90.5	74.5	24.3	11	59.5	77.0	105.5	79.6	28.6	-0.52	0.609
Black	6	70.0	90.5	121.0	91.0	41.0	2	-----	-----	-----	79.5	9.2	0.64	0.546
Hispanic	59	58.0	72.0	96.5	77.4	28.0	45	67.0	92.0	102.0	87.2	30.5	-1.68	0.097
Mingo														
White	96	49.5	63.5	79.5	66.1	25.0	95	53.0	69.0	87.0	69.9	24.0	-1.05	0.296
Black	10	42.0	58.0	68.0	56.6	18.1	0							

Table 7-8 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
Greene/Humphreys														
White	15	15.9	17.0	24.3	20.8	8.5	16	18.7	22.3	25.8	22.2	4.1	-0.58	0.569
Black	82	13.4	19.1	23.8	18.6	6.8	62	14.8	20.8	25.1	20.3	7.4	-1.37	0.173
St.Clair														
Black	84	18.5	22.5	27.5	23.0	6.6	70	17.1	21.2	26.8	22.0	7.7	0.88	0.382
Maricopa														
White	24	16.3	19.3	24.1	20.7	6.6	10	19.4	24.7	28.3	23.4	6.5	-1.09	0.289
Black	5	23.0	23.4	35.3	26.7	12.5	2	-----	-----	-----	24.9	5.4	0.27	0.795
Hispanic	60	17.6	22.8	26.8	23.0	8.4	45	19.6	26.4	32.0	25.8	9.3	-1.59	0.116
Mingo														
White	91	14.5	19.8	25.5	20.8	7.9	91	16.7	20.7	27.4	21.7	7.6	-0.79	0.431
Black	10	15.4	20.6	23.2	20.3	6.6	1	-----	29.3	-----	29.3	-----	-4.28	0.002
FERRITIN (NG/ML)														
Greene/Humphreys														
White	15	15.0	21.0	30.5	22.5	6.4	14	16.0	21.0	29.0	23.7	11.8	-0.30	0.769
Black	79	17.0	22.0	30.0	24.3	11.0	61	19.0	26.0	35.0	27.4	11.9	-1.61	0.111
St.Clair														
Black	86	19.5	27.0	35.5	28.8	15.7	72	17.0	25.5	35.0	26.9	14.0	1.21	0.230
Maricopa														
White	22	13.0	20.0	26.0	21.4	10.7	10	17.0	18.5	34.0	22.8	8.5	-0.37	0.716
Black	5	27.0	34.0	47.0	32.8	17.7	2	-----	-----	-----	19.3	5.0	1.54	0.185
Hispanic	59	14.0	18.0	24.0	20.0	10.1	40	13.0	16.0	22.0	18.9	10.7	0.54	0.589
Mingo														
White	94	15.0	19.0	26.0	21.8	11.8	88	14.0	19.0	28.0	21.2	10.5	0.36	0.719
Black	11	17.5	31.0	35.0	30.1	12.8	1	-----	28.0	-----	28.0	-----	0.54	0.599
B-CAROTENE (MCG/DL)														
Greene/Humphreys														
White	14	101.0	111.5	132.0	111.4	27.6	11	64.0	96.0	120.0	98.6	36.7	0.96	0.349
Black	52	77.5	103.0	129.5	103.9	33.0	40	76.0	88.0	102.0	88.2	21.2	2.86	0.005
Maricopa														
White	24	71.5	87.0	110.0	89.8	24.4	11	63.5	81.0	94.5	77.4	23.0	1.46	0.160
Black	5	105.0	107.0	137.0	115.6	37.2	2	-----	-----	-----	93.5	30.4	0.81	0.502
Hispanic	58	82.0	102.0	117.0	101.9	27.3	44	71.0	92.5	110.5	93.8	30.8	1.38	0.170

Table 7-8 (continued)

BIOCHEMICAL INDICATORS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN ETHNICITY BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CHOLESTEROL (MG/DL)														
Greene/Humphreys														
White	15	139.0	162.0	173.5	163.2	28.9	18	160.0	183.0	191.0	176.5	26.6	-1.37	0.183
Black	92	146.5	167.0	187.5	167.5	32.6	66	156.0	172.0	184.0	169.2	30.0	-0.35	0.730
St.Clair														
Black	100	144.5	165.0	184.0	168.9	32.5	78	149.0	163.5	186.0	170.0	35.2	-0.23	0.822
Maricopa														
White	26	146.0	159.5	178.0	159.6	20.6	11	137.0	144.0	151.0	143.6	22.5	2.02	0.059
Black	6	170.0	194.5	220.0	189.5	33.6	2	-----	-----	-----	161.0	56.6	0.67	0.622
Hispanic	61	139.0	158.0	176.0	161.6	30.6	45	141.0	160.0	171.0	163.1	30.3	-0.25	0.803
Mingo														
White	103	142.0	157.0	170.0	156.6	24.8	99	132.5	155.0	169.5	152.4	29.3	1.09	0.279
Black	11	137.0	147.0	158.5	153.2	22.1	1	-----	201.0	-----	201.0	-----	-7.16	0.000
VITAMIN A (MCG/DL)														
Greene/Humphreys														
White	14	29.0	36.0	41.0	35.5	7.1	10	33.0	36.5	43.0	38.0	5.4	-0.98	0.337
Black	51	30.0	36.0	44.5	37.6	11.3	48	32.0	36.5	42.0	37.7	8.2	-0.06	0.952
Maricopa														
White	23	33.0	36.0	39.0	36.5	4.9	11	34.5	36.0	44.0	38.7	7.1	-0.93	0.367
Black	5	30.0	35.0	36.0	33.6	4.5	1	-----	40.0	-----	40.0	-----	-3.18	0.034
Hispanic	59	31.0	35.0	41.0	35.8	8.0	44	31.0	35.0	39.0	35.9	7.0	-0.10	0.919
VITAMIN C (MG/DL)														
Maricopa														
White	20	1.3	1.5	1.8	1.6	0.5	9	1.2	1.3	1.5	1.4	0.3	1.64	0.077
Black	5	1.2	1.5	1.6	1.4	0.7	1	-----	1.1	-----	1.1	-----	1.10	0.335
Hispanic	45	1.1	1.5	1.8	1.4	0.5	29	1.0	1.3	1.6	1.3	0.4	1.37	0.177

Table 7-9

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS ACROSS SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	233	35.0	36.5	38.0	36.5	2.4	541	35.0	36.5	38.0	36.4	2.5	0.40	0.686
HEMOGLOBIN (GM/DL)	230	12.2	12.8	13.4	12.8	0.9	535	12.3	13.0	13.5	12.9	0.9	-1.05	0.296
FEP (MCG/DL)	227	12.0	18.0	22.5	18.6	9.1	533	14.0	19.0	25.0	20.5	9.0	-2.64	0.009
MCHC (%)	227	34.1	35.0	36.1	35.2	1.7	531	34.3	35.5	36.4	35.5	1.7	-1.98	0.048
TIBC (MCG/DL)	191	297.0	320.0	349.0	323.8	38.9	492	297.0	327.0	354.0	327.6	42.0	-1.13	0.259
SERUM IRON (MCG/DL)	200	52.0	68.0	86.0	68.8	24.3	505	53.0	68.0	89.0	71.9	26.4	-1.47	0.143
TS (%)	187	16.4	20.8	25.5	21.0	7.1	486	16.2	20.8	27.0	21.9	7.9	-1.39	0.167
FERRITIN (NG/DL)	187	15.0	22.0	31.5	24.8	13.2	478	15.0	21.0	30.0	24.5	18.1	0.24	0.808
B-CAROTENE (MCG/DL)	43	80.5	93.0	113.5	96.7	26.1	229	75.0	96.0	115.0	97.0	29.5	-0.06	0.949
CHOLESTEROL (MG/DL)	214	147.0	165.0	183.0	166.7	30.0	525	141.0	158.0	180.0	161.9	30.9	1.96	0.051
VITAMIN A (MCG/DL)	43	32.0	36.0	42.0	37.0	7.0	225	31.0	36.0	42.0	36.6	8.4	0.34	0.735
VITAMIN C (MG/DL)	0						109	1.1	1.5	1.7	1.4	0.5		

Table 7-9 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT														
Greene/Humphreys	83	34.0	36.0	37.0	36.0	2.1	130	34.5	35.5	37.0	35.6	2.6	1.20	0.230
St.Clair	66	34.0	35.2	37.0	35.4	2.0	116	34.0	35.5	37.0	35.4	2.3	-0.03	0.977
Maricopa	0						155	35.0	36.5	38.0	36.5	2.2		
Mingo	84	36.5	37.8	39.5	37.8	2.4	140	36.5	37.8	39.2	37.9	2.1	-0.12	0.907
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	83	12.3	12.8	13.4	12.8	0.9	129	12.0	12.7	13.4	12.6	1.0	1.54	0.125
St.Clair	65	12.0	12.3	12.8	12.4	0.9	117	12.1	12.5	13.3	12.6	1.0	-1.37	0.173
Maricopa	0						152	12.6	13.1	13.6	13.1	0.8		
Mingo	82	12.7	13.2	13.7	13.1	0.9	137	12.7	13.3	13.9	13.2	0.8	-0.83	0.410
FEP (MCG/DL)														
Greene/Humphreys	83	12.0	18.0	22.5	18.3	8.2	128	14.0	18.0	24.0	19.6	8.6	-1.05	0.295
St.Clair	64	14.5	19.0	26.5	20.9	10.5	115	16.0	20.0	27.0	22.5	9.7	-1.02	0.310
Maricopa	0						155	18.0	22.0	28.0	23.5	7.5		
Mingo	80	10.0	15.0	21.0	17.2	8.6	135	10.0	14.0	20.0	16.4	8.5	0.64	0.521
MCHC (%)														
Greene/Humphreys	83	34.7	35.6	36.6	35.7	1.6	129	34.3	35.5	36.8	35.5	1.8	0.72	0.475
St.Clair	66	33.8	35.0	36.1	35.1	1.8	115	34.3	35.6	36.7	35.6	1.8	-1.99	0.048
Maricopa	0						150	34.9	35.7	36.5	35.7	1.7		
Mingo	78	33.8	34.6	35.5	34.8	1.6	137	34.0	34.9	35.9	34.9	1.4	-0.86	0.394

Table 7-9 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	66	302.0	331.5	359.0	333.2	40.6	113	306.0	330.0	359.0	332.5	43.2	0.10	0.918
St.Clair	53	300.0	317.0	350.0	326.0	40.3	108	297.0	317.5	338.5	319.6	31.0	1.01	0.314
Maricopa	0						145	304.0	338.0	363.0	337.9	47.1		
Mingo	72	289.5	314.5	338.5	313.6	34.0	126	289.0	315.0	345.0	318.2	39.9	-0.87	0.384
SERUM IRON (MCG/DL)														
Greene/Humphreys	71	47.5	64.0	83.0	65.9	25.0	119	50.5	63.0	80.0	65.6	23.3	0.10	0.921
St.Clair	56	58.5	74.0	91.5	75.1	23.4	108	53.0	69.5	91.0	71.5	25.6	0.92	0.359
Maricopa	0						150	60.0	75.0	102.0	80.5	28.7		
Mingo	73	51.0	67.0	80.0	66.7	23.9	128	50.0	66.0	84.0	67.8	24.7	-0.32	0.752
TS (%)														
Greene/Humphreys	66	13.5	19.4	24.0	19.6	7.4	111	14.7	19.5	24.3	19.7	6.8	-0.14	0.886
St.Clair	51	18.2	23.1	25.7	22.3	6.4	106	17.5	21.7	28.2	22.7	7.7	-0.36	0.722
Maricopa	0						146	17.6	23.3	29.5	23.6	8.5		
Mingo	70	16.4	20.9	27.1	21.5	7.2	123	14.5	19.8	26.5	21.1	7.9	0.32	0.750
FERRITIN (NG/DL)														
Greene/Humphreys	62	19.0	22.5	34.0	26.4	12.3	108	15.5	23.0	31.5	24.7	10.9	0.91	0.363
St.Clair	54	16.0	25.5	36.0	27.7	15.5	109	20.0	27.0	35.0	31.5	31.2	-1.03	0.307
Maricopa	0						138	14.0	18.0	25.0	20.6	10.7		
Mingo	71	13.5	19.0	27.5	21.2	11.4	123	15.0	19.0	28.0	22.5	11.4	-0.80	0.422

Table 7-9 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	43	80.5	93.0	113.5	96.7	26.1	85	76.0	96.0	123.0	98.8	31.0	-0.41	0.681
Maricopa	0						144	75.0	94.5	112.5	95.9	28.7		
CHOLESTEROL (MG/DL)														
Greene/Humphreys	70	148.0	173.5	191.0	173.1	31.6	123	147.5	167.0	184.0	166.0	30.1	1.53	0.129
St.Clair	64	154.5	173.0	195.5	171.4	29.9	117	143.0	159.0	183.0	167.9	35.3	0.71	0.480
Maricopa	0						151	139.5	158.0	178.5	161.5	29.4		
Mingo	80	138.5	160.5	170.5	157.2	26.3	134	135.0	150.0	170.0	153.2	27.3	1.06	0.291
VITAMIN A (MCG/DL)														
Greene/Humphreys	43	32.0	36.0	42.0	37.0	7.0	82	30.0	35.5	43.0	37.5	10.2	-0.28	0.773
Maricopa	0						143	31.5	36.0	39.5	36.1	7.1		
VITAMIN C (MG/DL)														
Maricopa	0						109	1.1	1.5	1.7	1.4	0.5		

Table 7-10

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY ACROSS SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
White	88	36.0	37.8	39.5	37.8	2.4	197	36.0	37.5	39.0	37.5	2.2	0.82	0.415
Black	144	34.0	35.5	37.0	35.7	2.1	235	34.0	35.5	37.0	35.5	2.5	1.01	0.315
Hispanic	1	-----	37.0	-----	37.0	-----	109	35.0	36.0	38.0	36.4	2.2	2.69	0.008
HEMOGLOBIN (GM/DL)														
White	86	12.7	13.3	13.9	13.2	0.9	194	12.7	13.2	13.8	13.2	0.8	-0.22	0.828
Black	143	12.0	12.5	13.2	12.6	0.9	235	12.0	12.5	13.3	12.6	1.0	0.41	0.680
Hispanic	1	-----	12.6	-----	12.6	-----	106	12.7	13.2	13.6	13.1	0.7	-6.82	0.000
FEP (MCG/DL)														
White	84	11.0	15.0	21.0	17.1	8.2	191	11.5	17.0	22.0	17.5	7.9	-0.37	0.715
Black	142	13.0	18.0	24.0	19.5	9.6	233	15.0	19.0	26.0	21.1	9.5	-1.57	0.117
Hispanic	1	-----	19.0	-----	19.0	-----	109	19.0	24.0	30.0	24.5	7.6	-7.63	0.000
MCHC (%)														
White	83	33.9	34.8	35.9	34.9	1.6	193	34.1	35.2	36.1	35.2	1.5	-1.32	0.190
Black	143	34.4	35.3	36.4	35.4	1.7	232	34.1	35.5	36.6	35.5	1.8	-0.56	0.573
Hispanic	1	-----	34.1	-----	34.1	-----	106	35.3	35.9	36.7	35.8	1.8	-10.87	0.000
TIBC (MCG/DL)														
White	74	290.0	314.0	340.0	315.5	34.5	176	290.5	319.0	349.0	320.8	42.0	-1.03	0.305
Black	116	299.5	322.5	350.0	328.7	40.7	213	301.0	326.0	346.0	325.2	37.7	0.75	0.451
Hispanic	1	-----	366.0	-----	366.0	-----	103	309.5	342.0	378.5	344.2	46.2	4.78	0.000
SERUM IRON (MCG/DL)														
White	78	53.0	67.5	80.0	67.7	23.0	183	51.0	66.0	88.0	70.0	25.0	-0.72	0.475
Black	121	50.0	68.0	87.0	69.9	25.1	218	52.0	66.0	87.0	68.7	25.1	0.36	0.718
Hispanic	1	-----	34.0	-----	34.0	-----	104	63.0	82.0	101.5	81.6	29.4	-16.51	0.000

Table 7-10 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY ACROSS SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
White	73	16.7	21.3	26.4	21.5	7.0	174	15.9	19.7	26.1	21.2	7.6	0.33	0.745
Black	113	16.0	20.8	25.3	20.8	7.2	207	16.0	20.6	26.2	21.4	7.5	-0.64	0.521
Hispanic	1	-----	9.3	-----	9.3	-----	105	17.8	24.0	30.1	24.2	8.8	-17.25	0.000
FERRITIN (NG/DL)														
White	72	13.5	18.0	26.5	20.7	10.9	171	15.0	19.0	27.0	22.2	10.9	-0.95	0.342
Black	114	17.0	25.0	35.0	27.4	14.0	208	18.0	26.0	33.5	28.8	24.0	-0.64	0.523
Hispanic	1	-----	24.0	-----	24.0	-----	99	13.5	17.0	22.5	19.6	10.3	4.29	0.000
B-CAROTENE (MCG/DL)														
White	4	102.5	106.0	116.0	109.3	10.2	56	66.5	88.5	113.5	93.1	29.8	2.49	0.038
Black	39	77.0	92.0	113.5	95.4	26.9	71	76.0	96.0	116.0	98.0	30.2	-0.46	0.644
Hispanic	0						102	76.0	96.0	115.0	98.4	29.0		
CHOLESTEROL (MG/DL)														
White	83	140.5	163.0	174.5	159.2	28.3	189	139.0	155.0	172.0	155.4	26.5	1.04	0.298
Black	130	150.0	173.0	188.0	171.6	30.2	230	143.0	162.0	186.0	167.0	33.6	1.34	0.183
Hispanic	1	-----	140.0	-----	140.0	-----	106	139.0	158.5	176.0	162.2	30.3	-7.54	0.000
VITAMIN A (MCG/DL)														
White	4	36.0	38.5	43.5	39.8	4.8	54	33.0	36.0	42.0	36.7	6.0	1.19	0.300
Black	39	31.5	36.0	42.0	36.7	7.2	68	30.0	36.0	43.5	37.7	10.8	-0.54	0.593
Hispanic	0						103	31.0	35.0	39.5	35.8	7.6		
VITAMIN C (MG/DL)														
White	0						29	1.2	1.5	1.7	1.6	0.4		
Black	0						6	1.1	1.3	1.6	1.4	0.6		
Hispanic	0						74	1.0	1.5	1.7	1.4	0.4		

Table 7-10 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY BY SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys														
White	10	35.0	36.0	38.5	36.8	2.0	25	35.0	36.0	37.5	36.5	2.3	0.43	0.670
Black	73	34.0	36.0	37.0	35.9	2.1	105	34.0	35.0	37.0	35.4	2.7	1.36	0.175
St Clair														
Black	65	34.0	35.0	36.5	35.4	1.9	116	34.0	35.5	37.0	35.4	2.3	-0.11	0.916
Maricopa														
White	0						38	35.0	36.5	38.0	36.7	2.2		
Black	0						8	33.5	38.0	39.3	36.9	3.1		
Hispanic	0						109	35.0	36.0	38.0	36.4	2.2		
Mingo														
White	78	36.5	38.0	39.5	37.9	2.4	134	36.5	38.0	39.5	37.9	2.1	-0.21	0.835
Black	6	36.5	37.5	38.0	37.5	1.8	6	35.0	36.8	39.0	36.6	2.6	0.71	0.497
HEMOGLOBIN (GM/DL)														
Greene/Humphreys														
White	10	12.5	13.3	13.9	13.3	0.9	25	12.5	13.1	14.0	13.2	0.9	0.32	0.749
Black	73	12.3	12.7	13.4	12.8	0.9	104	11.9	12.5	13.3	12.5	1.0	1.91	0.058
St Clair														
Black	64	11.9	12.3	12.9	12.4	0.9	117	12.1	12.5	13.3	12.6	1.0	-1.37	0.172
Maricopa														
White	0						38	12.7	13.0	13.5	13.1	0.7		
Black	0						8	11.9	12.6	13.3	12.5	0.9		
Hispanic	0						106	12.7	13.2	13.6	13.1	0.7		
Mingo														
White	76	12.7	13.3	13.7	13.2	0.9	131	12.7	13.3	13.9	13.3	0.7	-0.68	0.499
Black	6	12.6	13.1	13.1	12.8	1.0	6	12.2	13.2	13.6	13.1	1.1	-0.38	0.713
FEP (MCG/DL)														
Greene/Humphreys														
White	10	12.0	17.0	21.0	17.7	6.4	24	15.0	20.0	22.0	19.3	7.9	-0.62	0.545
Black	73	12.0	18.0	23.0	18.4	8.5	104	14.0	18.0	24.0	19.6	8.8	-0.93	0.355
St Clair														
Black	63	14.5	19.0	26.5	20.9	10.6	115	16.0	20.0	27.0	22.5	9.7	-0.99	0.324
Maricopa														
White	0						38	18.0	19.5	24.0	21.2	5.5		
Black	0						8	11.0	15.5	27.5	20.0	11.0		
Hispanic	0						109	19.0	24.0	30.0	24.5	7.6		
Mingo														
White	74	11.0	15.0	21.0	17.1	8.4	129	10.0	14.0	20.0	16.1	8.2	0.78	0.437
Black	6	9.0	12.5	30.0	18.3	12.2	6	11.0	19.0	28.0	22.0	13.6	-0.49	0.633

Table 7-10 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY BY SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MCHC (%)														
Greene/Humphreys														
White	10	35.6	36.3	36.6	36.0	0.8	25	35.0	36.3	36.9	36.1	2.0	-0.18	0.858
Black	73	34.7	35.5	36.5	35.6	1.6	104	34.1	35.5	36.6	35.4	1.8	1.02	0.311
St Clair														
Black	65	33.8	35.0	36.1	35.1	1.9	115	34.3	35.6	36.7	35.7	1.8	-1.92	0.057
Maricopa														
White	0						37	34.8	35.6	36.2	35.5	1.3		
Black	0						7	33.2	33.6	34.2	33.7	0.7		
Hispanic	0						106	35.3	35.9	36.7	35.9	1.8		
Mingo														
White	73	33.8	34.6	35.5	34.8	1.6	131	33.9	34.8	35.9	34.9	1.4	-0.64	0.521
Black	5	34.5	34.8	34.9	34.7	0.2	6	34.9	35.6	36.8	35.7	1.2	-1.96	0.107
TIBC (MCG/DL)														
Greene/Humphreys														
White	8	310.0	325.0	356.0	330.9	28.5	21	311.0	337.0	355.0	331.9	37.8	-0.08	0.938
Black	58	301.0	331.[illegible]	359.0	333.5	42.1	92	305.0	330.0	360.0	332.6	44.5	0.12	0.907
St Clair														
Black	52	299.5	316.5	350.0	325.3	40.3	108	297.0	317.5	338.5	319.6	31.0	0.88	0.379
Maricopa														
White	0						35	292.5	316.0	359.0	322.5	49.8		
Black	0						7	304.0	317.0	341.5	322.1	20.6		
Hispanic	0						103	309.5	342.0	378.5	344.2	46.2		
Mingo														
White	66	289.0	314.0	339.0	313.7	34.9	120	289.0	316.5	344.5	318.3	40.2	-0.83	0.410
Black	6	292.0	322.0	329.0	312.3	24.6	6	293.0	297.0	358.0	316.2	35.4	-0.22	0.832
SERUM IRON (MCG/DL)														
Greene/Humphreys														
White	10	55.0	61.5	77.0	64.9	15.9	22	53.0	66.5	91.0	71.5	23.9	-0.92	0.368
Black	61	45.0	64.0	84.0	66.1	26.3	97	49.0	63.0	76.0	64.2	23.0	0.46	0.649
St Clair														
Black	55	59.0	74.0	91.5	75.9	22.9	108	53.0	69.5	91.0	71.5	25.6	1.12	0.266
Maricopa														
White	0						33	58.0	68.0	95.0	76.0	25.3		
Black	0						8	70.5	79.5	115.5	88.1	35.2		
Hispanic	0						104	63.0	82.0	101.5	81.6	29.4		
Mingo														
White	68	53.0	69.0	80.5	68.1	23.9	123	50.0	66.0	84.5	67.9	25.0	0.06	0.949
Black	5	42.0	46.0	48.0	47.2	13.2	5	68.0	68.0	75.0	66.0	18.5	-1.85	0.107

Table 7-10 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY BY SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
Greene/Humphreys														
White	8	17.3	19.9	24.3	20.7	4.0	23	16.7	21.4	25.8	21.8	7.3	-0.49	0.630
Black	58	13.4	19.3	24.0	19.4	7.8	88	14.4	19.3	24.1	19.2	6.5	0.17	0.869
St Clair														
Black	50	18.3	23.1	25.7	22.6	6.1	106	17.5	21.7	28.2	22.7	7.7	-0.13	0.893
Maricopa														
White	0						34	16.2	19.6	27.5	21.5	6.6		
Black	0						7	22.0	23.4	32.0	26.2	10.4		
Hispanic	0						105	17.8	24.0	30.1	24.2	8.8		
Mingo														
White	65	16.6	21.3	27.1	21.6	7.3	117	14.4	19.4	26.1	21.0	8.0	0.53	0.598
Black	5	15.4	16.4	20.2	19.1	6.0	6	20.9	23.1	28.3	22.7	7.5	-0.87	0.405
FERRITIN (NG/DL)														
Greene/Humphreys														
White	7	16.0	18.0	33.5	25.0	12.4	22	15.0	21.0	30.0	22.5	10.0	0.49	0.639
Black	55	19.5	23.0	33.0	26.6	12.4	86	16.0	24.0	32.0	25.3	11.1	0.65	0.518
St Clair														
Black	53	16.0	26.0	36.0	27.8	15.6	109	20.0	27.0	35.0	31.5	31.2	-1.00	0.319
Maricopa														
White	0						32	15.5	19.5	29.0	21.8	10.2		
Black	0						7	18.5	27.0	40.5	29.0	16.0		
Hispanic	0						99	13.5	17.0	22.5	19.6	10.3		
Mingo														
White	65	13.0	18.0	25.0	20.2	10.7	117	15.0	19.0	27.0	22.2	11.4	-1.15	0.251
Black	6	18.0	29.5	34.0	31.0	14.9	6	17.0	32.0	36.0	28.8	10.1	0.29	0.778
B-CAROTENE (MCG/DL)														
Greene/Humphreys														
White	4	102.5	106.0	116.0	109.3	10.2	21	73.0	109.0	132.0	105.1	34.6	0.45	0.658
Black	39	77.0	92.0	113.5	95.4	26.9	64	76.0	96.0	115.5	96.8	29.8	-0.24	0.810
Maricopa														
White	0						35	66.5	85.0	105.0	85.9	24.3		
Black	0						7	88.5	107.0	126.0	109.3	34.6		
Hispanic	0						102	76.0	96.0	115.0	98.4	29.0		

Table 7-10 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN AGE GROUPS WITHIN ETHNICITY BY SITE

	2-4 YEAR OLDS						4-6 YEAR OLDS							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CHOLESTEROL (MG/DL)														
Greene/Humphreys														
White	9	142.0	172.0	191.0	172.1	39.7	24	152.0	169.0	185.0	169.8	23.3	0.16	0.875
Black	61	150.0	174.0	191.0	173.3	30.6	99	145.5	167.0	184.0	165.1	31.6	1.62	0.107
St Clair														
Black	63	156.5	173.0	185.5	171.9	29.9	117	143.0	159.0	183.0	167.8	35.3	0.81	0.422
Maricopa														
White	0						37	141.0	151.0	171.0	154.9	22.2		
Black	0						8	152.0	194.5	210.5	182.4	37.9		
Hispanic	0						106	139.0	158.5	176.0	162.2	30.3		
Mingo														
White	74	139.0	163.0	171.0	157.6	26.5	128	134.0	149.5	169.5	152.8	27.4	1.23	0.222
Black	6	133.0	147.0	158.0	152.3	26.2	6	141.0	158.5	191.0	162.0	25.7	-0.65	0.533
VITAMIN A (MCG/DL)														
Greene/Humphreys														
White	4	36.0	38.5	43.5	39.8	4.8	20	31.5	34.0	42.5	35.9	6.6	1.37	0.220
Black	39	31.5	36.0	42.0	36.7	7.2	62	30.0	36.0	45.0	38.0	11.2	-0.67	0.504
Maricopa														
White	0						34	33.0	36.0	40.0	37.2	5.7		
Black	0						6	30.0	35.5	39.0	34.7	4.8		
Hispanic	0						103	31.0	35.0	39.5	35.8	7.6		
VITAMIN C (MG/DL)														
Maricopa														
White	0						29	1.2	1.5	1.7	1.6	0.4		
Black	0						6	1.1	1.3	1.6	1.4	0.6		
Hispanic	0						74	1.0	1.5	1.7	1.4	0.4		

Table 7-11

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES ACROSS SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	392	35.0	36.5	38.0	36.4	2.4	382	35.0	36.0	38.0	36.4	2.5	-0.05	0.961
HEMOGLOBIN (GM/DL)	388	12.3	12.9	13.5	12.9	0.9	377	12.3	12.9	13.5	12.9	0.9	0.37	0.715
FEP (MCG/DL)	384	14.0	19.0	24.0	20.0	8.5	376	13.0	19.0	25.0	19.9	9.6	0.04	0.967
MCHC (%)	384	34.3	35.4	36.4	35.4	1.6	374	34.2	35.4	36.3	35.4	1.8	0.15	0.877
TIBC (MCG/DL)	347	298.5	328.0	351.5	328.4	41.5	336	297.0	320.0	353.0	324.7	40.8	1.18	0.238
SERUM IRON (MCG/DL)	357	53.0	67.0	88.0	70.7	25.3	348	52.0	69.0	81.0	71.3	26.5	-0.33	0.739
TS (%)	345	16.6	20.4	26.4	21.6	7.6	328	16.1	21.1	27.2	21.8	7.9	-0.28	0.781
FERRITIN (NG/DL)	343	15.0	20.0	28.0	23.7	18.8	322	16.0	23.0	32.0	25.6	13.1	-1.46	0.145
B-CAROTENE (MCG/DL)	138	75.0	96.0	117.0	97.6	29.9	134	76.0	95.5	115.0	96.2	28.1	0.40	0.693
CHOLESTEROL (MG/DL)	377	143.0	162.0	182.0	163.8	30.6	382	141.0	159.0	181.0	162.7	30.9	0.45	0.653
VITAMIN A (MCG/DL)	137	32.0	36.0	42.0	37.0	8.5	131	31.0	36.0	41.5	36.3	7.8	0.67	0.501
VITAMIN C (MG/DL)	55	1.1	1.5	1.7	1.5	0.5	54	1.1	1.4	1.7	1.4	0.4	0.66	0.510

Table 7-11 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT														
Greene/Humphreys	107	34.5	35.5	37.0	35.6	2.1	106	34.0	36.0	37.5	35.8	2.7	-0.56	0.576
St.Clair	96	34.0	35.5	37.0	35.3	2.4	86	34.0	35.2	37.0	35.5	1.8	-0.66	0.513
Maricopa	74	35.0	36.5	38.0	36.7	2.0	81	35.0	36.0	38.0	36.3	2.4	1.07	0.288
Mingo	115	36.5	38.0	39.5	37.9	2.2	109	36.5	37.5	39.5	37.8	2.3	0.29	0.774
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	106	12.1	12.7	13.3	12.7	0.9	106	12.0	12.8	13.5	12.7	1.0	-0.40	0.687
St.Clair	96	12.0	12.5	13.3	12.6	1.0	86	12.0	12.3	13.0	12.5	0.8	0.52	0.603
Maricopa	73	12.8	13.2	13.6	13.1	0.7	79	12.6	13.0	13.4	13.0	0.8	1.36	0.176
Mingo	113	12.7	13.2	13.8	13.2	0.8	106	12.7	13.2	13.9	13.2	0.9	-0.17	0.861
FEP (MCG/DL)														
Greene/Humphreys	106	14.0	18.0	23.0	19.4	8.8	105	13.0	18.0	24.0	18.8	6.2	0.45	0.657
St.Clair	95	16.0	20.0	27.0	21.9	9.6	84	15.0	19.0	26.5	21.9	10.5	0.04	0.964
Maricopa	74	19.0	22.0	28.0	23.0	6.8	81	18.0	23.0	30.0	23.9	8.1	-0.70	0.487
Mingo	109	11.0	15.0	21.0	16.8	7.2	106	9.0	13.5	20.0	16.5	9.8	0.22	0.825
MCHC (%)														
Greene/Humphreys	106	34.6	35.6	36.7	35.6	1.7	106	34.2	35.5	36.6	35.6	1.8	-0.01	0.990
St.Clair	95	34.3	35.6	36.6	35.6	1.8	86	34.0	35.3	36.6	35.3	1.8	0.83	0.408
Maricopa	72	34.9	35.9	36.8	35.8	1.4	78	35.0	35.6	36.3	35.7	1.9	0.45	0.653
Mingo	111	33.9	34.8	35.8	34.8	1.4	104	34.0	34.8	35.9	35.0	1.5	-0.79	0.433

Table 7-11 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	94	303.0	333.0	359.0	332.0	41.8	85	307.0	330.0	357.0	333.6	42.7	-0.26	0.793
St.Clair	81	301.0	317.0	344.0	321.9	35.5	80	298.5	317.5	340.5	321.6	33.4	0.06	0.954
Maricopa	68	310.0	342.5	376.0	342.3	47.7	77	300.0	329.0	362.0	334.0	46.5	1.06	0.293
Mingo	104	293.0	319.0	345.0	321.1	39.0	94	288.0	310.0	339.0	311.5	36.1	1.80	0.074
SERUM IRON (MCG/DL)														
Greene/Humphreys	97	50.0	64.0	83.0	67.3	24.0	93	49.0	63.0	82.0	64.0	23.7	0.94	0.348
St.Clair	84	53.0	66.5	89.0	70.3	25.4	80	56.0	75.0	92.5	75.3	24.2	-1.29	0.198
Maricopa	70	60.0	74.0	100.0	79.8	28.9	80	59.0	78.5	102.0	81.2	28.7	-0.30	0.762
Mingo	106	53.0	66.5	80.0	68.0	22.8	95	46.5	67.0	83.0	66.8	26.1	0.37	0.715
TS (%)														
Greene/Humphreys	91	15.0	19.5	24.3	20.1	6.7	86	13.7	19.1	24.3	19.3	7.3	0.77	0.441
St.Clair	80	17.2	21.7	27.4	22.2	7.6	77	18.3	23.2	27.4	23.0	7.0	-0.66	0.508
Maricopa	69	18.1	23.0	27.1	23.3	8.5	77	16.2	23.4	30.4	23.9	8.5	-0.43	0.669
Mingo	105	15.7	19.9	26.4	21.3	7.5	88	15.4	20.8	27.2	21.2	7.9	0.06	0.948
FERRITIN (NG/DL)														
Greene/Humphreys	91	16.0	23.0	31.5	24.7	11.1	79	18.0	24.0	32.0	26.2	11.8	-0.85	0.395
St.Clair	84	17.5	25.0	35.0	30.9	34.6	79	19.0	27.0	35.0	29.6	15.4	0.31	0.755
Maricopa	66	13.0	16.0	26.0	20.4	11.3	72	15.0	18.5	24.0	20.8	10.3	-0.23	0.816
Mingo	102	14.0	17.5	24.0	19.0	8.6	92	15.0	22.5	33.5	25.4	13.1	-3.94	0.000

Table 7-11 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	69	76.0	96.0	117.0	98.1	29.9	59	78.0	96.0	117.0	98.1	29.0	0.00	0.998
Maricopa	69	72.0	96.0	113.0	97.1	30.1	75	76.0	92.0	112.0	94.8	27.4	0.49	0.624
CHOLESTEROL (MG/DL)														
Greene/Humphreys	99	154.5	170.0	188.0	170.7	30.0	94	143.0	165.0	184.0	166.4	31.6	0.98	0.329
St.Clair	96	141.0	157.5	183.0	166.1	36.5	85	153.0	168.0	189.0	172.6	29.5	-1.33	0.187
Maricopa	72	147.0	160.0	179.0	162.5	27.2	79	138.0	151.0	178.5	160.5	31.4	0.43	0.670
Mingo	110	139.0	158.0	173.0	156.2	26.0	104	137.5	151.0	167.0	153.1	28.0	0.85	0.394
VITAMIN A (MCG/DL)														
Greene/Humphreys	68	30.0	36.0	43.0	37.5	10.1	57	31.0	36.0	44.0	37.1	8.2	0.19	0.847
Maricopa	69	32.0	36.0	40.0	36.6	6.7	74	31.0	35.0	39.0	35.7	7.4	0.72	0.473
VITAMIN C (MG/DL)														
Maricopa	55	1.2	1.5	1.7	1.5	0.5	54	1.1	1.4	1.7	1.4	0.4	0.66	0.510

Table 7-12

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES ACROSS SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	114	34.5	36.3	38.0	36.5	2.5	119	35.0	36.5	38.0	36.5	2.3	-0.16	0.870
HEMOGLOBIN (GM/DL)	112	12.3	12.9	13.4	12.9	0.9	118	12.1	12.8	13.5	12.8	0.9	0.72	0.471
FEP (MCG/DL)	111	13.0	18.0	21.5	18.4	7.9	116	10.5	17.0	24.0	18.9	10.2	-0.44	0.663
MCHC (%)	111	34.3	35.3	36.6	35.4	1.8	116	34.0	34.9	35.9	35.0	1.6	1.39	0.166
TIBC (MCG/DL)	96	295.0	322.5	350.0	326.0	39.1	95	298.0	317.0	344.5	321.5	38.7	0.80	0.427
SERUM IRON (MCG/DL)	99	55.0	68.0	83.5	70.9	24.3	101	49.0	67.0	87.0	65.8	24.4	1.20	0.231
TS (%)	94	16.6	20.4	26.4	21.4	7.2	93	16.0	21.3	25.2	20.7	7.1	0.71	0.480
FERRITIN (NG/DL)	94	14.0	20.0	28.0	21.9	11.0	93	17.0	25.0	35.0	27.8	14.7	-3.10	0.002
B-CAROTENE (MCG/DL)	24	80.5	96.0	117.5	98.2	26.6	19	79.5	92.0	107.0	94.8	26.0	0.42	0.674
CHOLESTEROL (MG/DL)	104	152.5	170.5	183.0	170.6	29.5	110	142.0	163.5	183.0	163.0	30.1	1.87	0.063
VITAMIN A (MCG/DL)	24	32.0	36.0	41.0	36.5	6.3	19	31.5	36.0	43.5	37.7	7.9	-0.58	0.569

Table 7-12 (continued)

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	43	34.0	35.0	37.0	35.6	2.0	40	35.0	36.5	38.0	36.4	2.2	-1.57	0.121
St.Clair	31	34.0	35.5	36.8	35.4	2.2	35	34.2	35.0	36.8	35.4	1.7	-0.03	0.976
Mingo	40	36.5	37.8	40.2	38.2	2.3	44	35.8	37.8	39.5	37.5	2.4	1.25	0.214
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	43	12.2	12.6	13.3	12.8	0.9	40	12.3	13.0	13.4	12.9	0.9	-0.63	0.530
St.Clair	30	11.9	12.5	13.1	12.6	1.0	35	12.0	12.2	12.6	12.3	0.8	1.16	0.250
Mingo	39	12.9	13.2	13.7	13.2	0.9	43	12.6	13.2	13.6	13.1	1.0	0.75	0.453
FEP (MCG/DL)														
Greene/Humphreys	43	13.0	18.0	21.0	17.8	7.0	40	11.5	19.5	25.0	19.0	9.4	-0.65	0.520
St.Clair	30	15.0	19.0	27.0	20.4	9.0	34	14.0	18.5	26.0	21.2	11.9	-0.31	0.760
Mingo	38	12.0	17.5	21.0	17.4	7.8	42	9.0	15.0	22.0	16.9	9.4	0.24	0.810
MCHC (%)														
Greene/Humphreys	43	34.9	35.7	37.0	35.9	1.6	40	34.7	35.5	36.3	35.5	1.4	1.11	0.271
St.Clair	31	34.3	35.6	36.6	35.4	1.9	35	33.7	34.8	35.8	34.8	1.8	1.10	0.278
Mingo	37	33.9	34.8	35.4	34.8	1.7	41	33.8	34.4	35.5	34.8	1.6	-0.01	0.991
TIBC (MCG/DL)														
Greene/Humphreys	36	305.0	338.5	360.0	337.8	40.6	30	299.0	324.5	346.0	327.7	40.5	1.01	0.318
St.Clair	24	296.0	313.0	347.0	322.4	42.4	29	301.0	328.0	354.0	329.0	39.0	-0.59	0.558
Mingo	36	289.0	325.5	342.0	316.7	33.1	36	289.5	306.5	323.0	310.4	35.2	0.79	0.434

Table 7-12 (continued)

BIOCHEMICAL INDICATORS FOR TWO TO FOUR YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
SERUM IRON (MCG/DL)														
Greene/Humphreys	38	57.0	67.0	84.0	71.4	24.8	33	42.0	55.0	79.0	59.7	24.1	2.02	0.047
St.Clair	25	54.0	65.0	87.0	68.2	25.5	31	66.5	83.0	93.5	80.7	20.2	-2.01	0.050
Mingo	36	55.5	70.0	82.0	72.2	23.4	37	46.0	64.0	75.0	61.4	23.4	1.98	0.051
TS (%)														
Greene/Humphreys	35	15.7	20.4	24.0	20.5	7.0	31	13.1	17.6	24.3	18.5	7.9	1.10	0.277
St.Clair	23	16.5	20.1	26.3	20.9	7.6	28	20.7	23.5	25.3	23.5	5.0	-1.42	0.164
Mingo	36	17.5	21.1	27.7	22.6	7.3	34	15.4	20.9	25.2	20.3	7.1	1.33	0.188
FERRITIN (NG/DL)														
Greene/Humphreys	33	15.0	22.0	32.0	23.9	11.0	29	20.0	25.0	36.0	29.4	13.2	-1.76	0.083
St.Clair	25	16.0	20.0	35.0	24.5	14.0	29	17.0	30.0	41.0	30.5	16.4	-1.46	0.150
Mingo	36	13.0	16.0	24.0	18.2	7.3	35	14.0	19.0	31.5	24.1	14.0	-2.22	0.031
B-CAROTENE (MCG/DL)														
Greene/Humphreys	24	80.5	96.0	117.5	98.2	26.6	19	79.5	92.0	107.0	94.8	26.0	0.42	0.674
CHOLESTEROL (MG/DL)														
Greene/Humphreys	37	165.0	176.0	197.0	179.9	32.4	33	144.0	157.0	184.0	165.6	29.2	1.95	0.056
St.Clair	30	149.0	164.0	179.0	164.6	29.9	34	164.0	174.0	193.0	177.4	29.1	-1.73	0.089
Mingo	37	152.0	165.0	177.0	166.1	24.2	43	137.0	149.0	165.0	149.6	26.0	2.94	0.004
VITAMIN A (MCG/DL)														
Greene/Humphreys	24	32.0	36.0	41.0	36.5	6.3	19	31.5	36.0	43.5	37.7	7.9	-0.58	0.569

Table 7-13

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES ACROSS SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	278	35.0	36.5	38.0	36.4	2.4	263	35.0	36.0	38.0	36.4	2.6	0.05	0.956
HEMOGLOBIN (GM/DL)	276	12.3	13.0	13.5	12.9	0.9	259	12.3	12.9	13.5	12.9	0.9	-0.08	0.936
FEP (MCG/DL)	273	15.0	19.0	25.0	20.6	8.7	260	14.0	19.0	26.0	20.4	9.2	0.27	0.787
MCHC (%)	273	34.3	35.5	36.4	35.4	1.6	258	34.4	35.6	36.4	35.5	1.8	-0.77	0.440
TIBC (MCG/DL)	251	299.5	329.0	354.0	329.3	42.4	241	297.0	324.0	354.0	325.9	41.6	0.89	0.372
SERUM IRON (MCG/DL)	258	53.0	66.0	88.0	70.6	25.8	247	54.0	70.0	93.0	73.2	27.1	-1.10	0.271
TS (%)	251	16.4	20.3	26.4	21.7	7.7	235	16.2	20.9	26.2	22.2	8.2	-0.73	0.465
FERRITIN (NG/DL)	249	15.0	21.0	29.0	24.3	22.2	229	16.0	22.0	31.0	24.7	12.4	-0.20	0.845
B-CAROTENE (MCG/DL)	114	73.0	96.0	115.0	97.5	30.7	115	76.0	96.0	115.0	96.5	28.5	0.26	0.793
CHOLESTEROL (MG/DL)	273	141.0	158.0	181.0	161.2	30.6	252	141.0	158.0	179.5	162.6	31.2	-0.55	0.585
VITAMIN A (MCG/DL)	113	31.0	36.0	42.0	37.1	8.9	112	31.0	35.0	40.5	36.1	7.7	0.92	0.359
VITAMIN C (MG/DL)	55	1.1	1.5	1.7	1.5	0.5	54	1.1	1.4	1.7	1.4	0.4	0.66	0.510

Table 7-13 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys	64	34.5	35.8	37.0	35.6	2.2	66	34.0	35.5	37.0	35.5	3.0	0.29	0.775
St.Clair	65	34.0	35.5	37.0	35.2	2.5	51	34.2	35.5	37.0	35.6	1.9	-0.78	0.438
Maricopa	74	35.0	36.5	38.0	36.7	2.0	81	35.0	36.0	38.0	36.3	2.4	1.07	0.288
Mingo	75	36.5	38.0	39.0	37.8	2.1	65	36.5	37.5	39.5	38.0	2.2	-0.70	0.488
HEMOGLOBIN (GM/DL)														
Greene/Humphreys	63	12.0	12.8	13.2	12.6	0.9	66	11.9	12.7	13.5	12.6	1.1	-0.10	0.917
St.Clair	66	12.1	12.5	13.3	12.6	1.1	51	12.2	12.6	13.2	12.7	0.9	-0.32	0.747
Maricopa	73	12.8	13.2	13.6	13.1	0.7	79	12.6	13.0	13.4	13.0	0.8	1.36	0.176
Mingo	74	12.7	13.2	13.8	13.2	0.7	63	12.7	13.3	14.0	13.3	0.8	-1.04	0.300
FEP (MCG/DL)														
Greene/Humphreys	63	14.5	18.0	24.0	20.4	9.7	65	14.0	18.0	23.0	18.8	7.5	1.09	0.276
St.Clair	65	16.0	20.0	27.0	22.6	9.8	50	16.0	20.5	27.0	22.3	9.6	0.18	0.857
Maricopa	74	19.0	22.0	28.0	23.0	6.8	81	18.0	23.0	30.0	23.9	8.1	-0.70	0.487
Mingo	71	11.0	15.0	20.5	16.5	6.9	64	9.0	13.0	20.0	16.3	10.1	0.13	0.895
MCHC (%)														
Greene/Humphreys	63	34.5	35.5	36.5	35.4	1.7	66	34.1	35.6	37.1	35.6	2.0	-0.78	0.437
St.Clair	64	34.3	35.6	36.5	35.6	1.8	51	34.3	35.6	37.0	35.6	1.7	-0.02	0.981
Maricopa	72	34.9	35.9	36.8	35.8	1.4	78	35.0	35.6	36.3	35.7	1.9	0.45	0.653
Mingo	74	33.9	34.8	35.8	34.8	1.3	63	34.1	34.9	36.0	35.1	1.5	1.10	0.272

Table 7-13 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS
WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TIBC (MCG/DL)														
Greene/Humphreys	58	303.0	331.5	359.0	328.4	42.5	55	310.0	330.0	358.0	336.9	43.9	-1.05	0.298
St.Clair	57	302.0	322.0	344.0	321.7	32.6	51	293.0	317.0	336.0	317.4	29.3	0.73	0.467
Maricopa	68	310.0	342.5	376.0	342.3	47.7	77	300.0	329.0	362.0	334.0	46.5	1.06	0.293
Mingo	68	293.5	318.5	347.0	323.4	41.8	58	288.0	313.5	341.0	312.2	36.9	1.60	0.113
SERUM IRON (MCG/DL)														
Greene/Humphreys	59	48.0	61.0	79.0	64.7	23.3	60	53.0	65.0	82.0	66.5	23.4	-0.42	0.677
St.Clair	59	53.0	67.0	89.5	71.2	25.5	49	54.0	71.0	92.0	71.8	26.0	-0.13	0.897
Maricopa	70	60.0	74.0	100.0	79.8	32.9	80	59.0	78.5	102.0	81.3	28.7	-0.30	0.762
Mingo	70	50.0	65.0	76.0	65.9	22.4	58	48.0	68.5	93.0	70.2	27.2	-0.97	0.334
TS (%)														
Greene/Humphreys	56	14.9	19.3	24.7	19.8	6.6	55	14.7	19.7	24.2	19.7	7.0	0.08	0.933
St.Clair	57	17.5	22.0	28.0	22.8	7.6	49	17.8	21.1	28.2	22.7	8.0	0.04	0.972
Maricopa	69	18.1	23.0	27.1	23.3	8.5	77	16.2	23.4	30.4	23.9	8.5	-0.43	0.669
Mingo	69	14.3	19.2	25.5	20.6	7.6	54	15.5	20.8	28.3	21.8	8.4	-0.81	0.422
FERRITIN (NG/DL)														
Greene/Humphreys	58	17.0	23.0	31.0	25.1	11.2	50	15.0	23.0	32.0	24.3	10.6	0.38	0.703
St.Clair	59	19.5	27.0	34.0	33.6	40.1	50	20.0	27.0	35.0	29.0	14.9	0.81	0.421
Maricopa	63	13.0	16.0	26.0	20.4	11.3	72	15.0	18.5	24.0	20.8	10.3	-0.23	0.816
Mingo	66	14.0	18.0	23.0	19.4	9.3	57	16.0	24.0	35.0	26.1	12.6	-3.30	0.001

Table 7-13 (continued)

BIOCHEMICAL INDICATORS FOR FOUR TO SIX YEAR OLDS WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
B-CAROTENE (MCG/DL)														
Greene/Humphreys	45	76.0	96.0	117.0	98.1	31.8	40	78.0	98.5	125.5	99.7	30.5	-0.24	0.812
Maricopa	69	72.0	96.0	113.0	97.1	30.1	75	76.0	92.0	112.0	94.8	27.4	0.49	0.624
CHOLESTEROL (MG/DL)														
Greene/Humphreys	62	150.0	167.5	184.0	165.2	27.2	61	140.0	167.0	184.0	166.8	33.1	-0.29	0.773
St.Clair	66	140.0	152.5	186.0	166.8	39.3	51	150.0	161.0	176.5	169.4	29.6	-0.41	0.680
Maricopa	72	147.0	160.0	179.0	162.5	27.2	79	138.0	151.0	178.5	160.5	31.4	0.43	0.670
Mingo	73	133.0	149.0	167.0	151.3	25.5	61	141.0	156.0	175.0	155.6	29.4	-0.89	0.373
VITAMIN A (MCG/DL)														
Greene/Humphreys	44	29.5	35.0	43.0	38.0	11.7	38	31.0	36.0	44.0	36.8	8.4	0.52	0.604
Maricopa	69	32.0	36.0	40.0	36.6	6.7	74	31.0	35.0	39.0	35.7	7.4	0.72	0.473
VITAMIN C (MG/DL)														
Maricopa	55	1.2	1.5	1.7	1.5	0.5	54	1.1	1.4	1.7	1.4	0.4	0.66	0.510

Table 7-14

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY ACROSS SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
White	143	36.1	37.5	39.0	37.6	2.2	142	36.0	37.5	39.0	37.6	2.4	0.25	0.800
Black	186	34.0	35.5	37.0	35.5	2.4	183	34.0	35.5	37.0	35.6	2.3	-0.41	0.685
Hispanic	53	35.5	36.5	38.0	36.6	1.7	57	35.0	36.0	38.0	36.3	2.5	0.71	0.482
HEMOGLOBIN (GM/DL)														
White	141	12.7	13.2	13.7	13.2	0.8	139	12.7	13.2	13.8	13.2	0.8	-0.35	0.724
Black	185	12.0	12.5	13.3	12.6	1.0	183	12.0	12.5	13.3	12.6	0.9	0.43	0.670
Hispanic	52	12.8	13.2	13.6	13.2	0.6	55	12.6	13.1	13.5	13.0	0.8	1.26	0.212
FEP (MCG/DL)														
White	137	12.0	17.0	21.0	17.5	7.2	138	11.0	17.0	22.0	17.3	8.7	0.24	0.808
Black	184	14.0	18.5	25.0	20.6	9.4	181	14.0	19.0	25.0	20.4	9.8	0.13	0.900
Hispanic	53	20.0	24.0	28.0	24.2	6.3	57	18.0	24.0	32.0	24.8	8.6	-0.47	0.640
MCHC (%)														
White	138	33.9	34.9	36.0	35.0	1.5	138	34.1	35.2	36.1	35.2	1.6	-1.06	0.290
Black	194	34.3	35.5	36.6	35.5	1.8	181	34.1	35.3	36.5	35.4	1.7	0.51	0.611
Hispanic	52	35.3	36.1	37.0	36.1	1.2	55	35.3	35.7	36.3	35.8	2.2	0.99	0.327
TIBC (MCG/DL)														
White	129	295.0	322.0	349.0	323.6	40.5	121	288.0	313.0	342.0	314.6	39.0	1.79	0.075
Black	169	302.0	325.0	349.0	325.9	39.0	160	299.0	325.5	348.0	327.1	38.7	-0.29	0.774
Hispanic	49	323.0	348.0	381.0	349.7	46.6	55	307.5	335.0	362.5	339.8	45.5	1.10	0.275
SERUM IRON (MCG/DL)														
White	135	53.0	67.0	82.0	69.1	23.2	126	51.0	66.0	82.0	69.5	25.7	-0.13	0.896
Black	173	52.0	65.0	87.0	69.4	25.6	166	51.0	69.0	87.0	68.8	24.6	0.25	0.807
Hispanic	49	63.0	75.0	99.0	79.2	28.7	56	64.5	84.0	102.5	82.9	30.5	-0.63	0.529

Table 7-14 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY ACROSS SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
White	131	15.7	19.8	25.8	21.1	7.4	116	16.2	20.6	26.9	21.5	7.5	-0.39	0.699
Black	164	16.1	20.7	26.3	21.4	7.4	156	15.8	20.8	25.4	20.9	7.4	0.61	0.543
Hispanic	50	17.6	23.5	26.7	23.3	8.5	56	16.9	24.3	32.1	24.6	9.3	-0.74	0.460
FERRITIN (NG/DL)														
White	127	13.5	17.0	23.5	19.1	8.7	116	15.0	21.0	32.0	24.7	12.3	-4.06	0.000
Black	168	17.0	25.0	34.0	28.4	25.9	154	19.0	26.0	35.0	28.1	13.9	0.11	0.909
Hispanic	48	13.0	15.5	23.5	18.3	10.3	52	14.0	18.0	22.5	19.9	10.2	-0.30	0.767
B-CAROTENE (MCG/DL)														
White	27	64.0	96.0	114.5	94.6	31.6	33	78.0	89.0	106.0	93.8	27.5	0.10	0.917
Black	61	76.0	96.0	117.0	96.6	30.3	49	81.0	96.0	115.0	97.7	27.6	-0.20	0.844
Hispanic	50	85.0	102.0	115.0	100.5	28.9	52	75.5	94.5	114.5	96.4	29.3	0.71	0.479
CHOLESTEROL (MG/DL)														
White	136	140.0	158.0	172.5	156.8	25.4	136	138.5	155.5	175.0	156.2	28.7	0.19	0.853
Black	189	146.0	169.0	188.0	168.7	33.8	171	147.0	165.0	186.0	168.7	30.9	-0.02	0.986
Hispanic	52	149.5	162.5	179.0	163.9	27.6	55	136.5	149.0	172.0	160.2	32.8	0.65	0.519
VITAMIN A (MCG/DL)														
White	26	33.0	35.0	38.0	35.3	5.5	32	33.5	37.5	43.0	38.3	6.1	-1.96	0.055
Black	61	30.0	36.0	42.0	37.8	10.2	46	30.0	36.0	44.0	36.7	8.7	0.61	0.542
Hispanic	50	32.0	37.0	42.0	36.9	7.5	53	31.0	35.0	38.0	34.8	7.6	1.38	0.171
VITAMIN C (MG/DL)														
White	13	1.4	1.5	1.7	1.6	0.5	16	1.2	1.3	1.8	1.5	0.4	0.83	0.416
Black	5	1.2	1.5	1.6	1.5	0.5	1	-----	0.5	-----	0.5	-----	4.92	0.008
Hispanic	37	1.0	1.5	1.6	1.4	0.5	37	1.1	1.4	1.7	1.4	0.4	0.03	0.979

Table 7-14 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY BY SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)														
Greene/Humphreys														
White	15	35.0	36.0	36.8	35.9	1.2	20	35.0	36.8	38.8	37.0	2.6	-1.73	0.093
Black	92	34.0	35.3	37.0	35.6	2.3	86	34.0	36.0	37.0	35.5	2.7	0.14	0.889
St Clair														
Black	95	34.0	35.5	37.0	35.3	2.4	86	34.0	35.3	37.0	35.8	1.8	-0.71	0.479
Maricopa														
White	17	35.5	36.5	39.0	37.1	2.5	21	35.0	36.5	38.0	36.3	1.9	1.02	0.315
Black	5	34.0	38.0	38.5	36.8	3.2	3	-----	-----	-----	37.0	3.6	-0.06	0.941
Hispanic	52	35.3	36.5	38.0	36.6	1.7	57	35.0	36.0	38.0	36.3	2.5	0.68	0.497
Mingo														
White	111	36.5	38.0	39.5	37.9	2.1	101	36.5	38.0	39.5	37.9	2.3	0.10	0.924
Black	4	35.0	38.3	39.5	37.4	3.5	8	35.8	36.8	37.8	36.9	1.5	0.28	0.787
HEMOGLOBIN (GM/DL)														
Greene/Humphreys														
White	15	12.4	12.9	13.3	12.8	0.7	20	12.5	13.9	14.2	13.4	1.0	-1.66	0.106
Black	91	12.0	12.6	13.3	12.6	0.9	86	11.9	12.7	13.4	12.6	1.0	0.41	0.684
St Clair														
Black	95	12.0	12.5	13.3	12.6	1.1	86	12.0	12.3	13.0	12.5	0.8	0.52	0.605
Maricopa														
White	17	13.0	13.2	13.7	13.2	0.8	21	12.6	13.0	13.4	12.9	0.6	1.36	0.185
Black	5	11.7	12.6	12.6	12.3	0.9	3	-----	-----	-----	12.9	0.8	-1.05	0.343
Hispanic	51	12.8	13.2	13.6	13.2	0.6	55	12.6	13.1	13.5	13.0	0.8	1.33	0.187
Mingo														
White	109	12.7	13.2	13.8	13.2	0.8	98	12.7	13.3	13.9	13.2	0.8	-0.30	0.764
Black	4	12.3	13.2	13.7	13.0	1.1	8	12.4	13.1	13.3	12.9	1.1	0.08	0.942
FEP (MCG/DL)														
Greene/Humphreys														
White	15	14.5	20.0	23.0	19.9	8.7	19	11.5	19.0	21.0	17.9	6.4	0.74	0.467
Black	91	14.0	18.0	23.0	19.3	8.8	86	13.0	18.0	24.0	19.0	8.6	0.18	0.861
St Clair														
Black	94	16.0	20.0	27.0	22.0	9.6	84	15.0	19.0	26.5	21.9	10.5	0.07	0.948
Maricopa														
White	17	16.0	19.0	21.0	19.2	4.8	21	19.0	22.0	27.0	22.8	5.8	-2.07	0.046
Black	5	11.0	27.0	28.0	23.6	12.8	3	-----	-----	-----	14.0	3.6	1.58	0.175
Hispanic	52	20.0	24.0	28.0	24.3	6.3	57	18.0	24.0	32.0	24.8	8.6	-0.40	0.691
Mingo														
White	105	12.0	15.0	21.0	16.9	7.3	98	9.0	13.0	20.0	16.0	9.2	0.78	0.435
Black	4	9.0	13.0	19.0	14.0	6.0	8	10.5	21.5	33.5	23.3	14.0	-1.60	0.141

Table 7-14 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY BY SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
MCHC (%)														
Greene/Humphreys														
White	15	35.1	36.4	36.8	36.0	1.2	20	35.1	36.0	36.7	36.2	2.0	-0.38	0.706
Black	91	34.6	35.9	36.6	35.5	1.7	86	34.2	35.4	36.5	35.4	1.8	0.27	0.787
St Clair														
Black	94	34.3	35.6	36.6	35.6	1.8	86	34.0	35.3	36.6	35.3	1.8	0.88	0.378
Maricopa														
White	16	34.5	35.6	36.4	35.5	1.5	21	34.9	35.6	36.2	35.6	1.0	-0.28	0.777
Black	5	33.2	33.3	33.6	33.5	0.6	2	-----	-----	-----	34.2	0.3	-2.13	0.100
Hispanic	51	35.4	36.1	37.0	36.1	1.2	55	35.3	35.7	36.3	35.8	2.2	1.11	0.272
Mingo														
White	107	33.9	34.8	35.8	34.8	1.4	97	33.9	34.7	35.8	34.9	1.5	-0.54	0.586
Black	4	34.5	34.9	35.2	34.8	0.5	7	34.7	34.9	36.3	35.6	1.2	-1.44	0.183
TIBC (MCG/DL)														
Greene/Humphreys														
White	14	311.0	343.0	357.0	338.4	32.2	15	308.5	329.0	346.0	326.3	27.4	1.02	0.318
Black	80	302.0	330.0	360.0	330.8	43.3	70	306.0	330.0	359.0	335.4	43.8	-0.64	0.521
St Clair														
Black	80	298.5	317.0	344.0	321.3	35.4	80	298.5	317.5	340.5	321.6	33.4	-0.04	0.965
Maricopa														
White	15	300.5	319.0	348.5	322.6	52.6	20	286.5	309.5	361.0	321.5	48.9	0.13	0.898
Black	5	317.0	340.0	343.0	330.4	16.4	2	-----	-----	-----	301.5	2.1	3.46	0.026
Hispanic	48	320.0	347.5	381.5	349.3	47.1	55	307.5	335.0	362.5	338.8	45.5	1.05	0.297
Mingo														
White	100	293.0	319.0	346.0	321.5	38.5	85	288.0	310.0	339.0	311.1	36.5	1.86	0.065
Black	4	290.0	311.0	332.5	311.3	24.8	8	294.5	307.0	342.5	315.8	22.6	-0.27	0.797
SERUM IRON (MCG/DL)														
Greene/Humphreys														
White	14	58.0	69.0	81.0	68.6	18.9	18	53.0	62.0	93.0	70.1	24.1	-0.19	0.847
Black	83	49.0	64.0	83.0	67.1	24.8	75	43.5	63.0	78.0	62.6	23.6	1.16	0.246
St Clair														
Black	83	54.0	67.0	89.0	70.7	25.2	90	56.0	75.0	92.5	75.3	24.2	-1.18	0.240
Maricopa														
White	17	59.0	69.0	91.0	76.4	27.0	21	58.0	66.0	95.0	75.7	24.5	0.09	0.930
Black	5	70.0	73.0	121.0	87.6	44.5	3	-----	-----	-----	89.0	19.7	-0.06	0.953
Hispanic	48	63.0	78.0	99.5	80.1	26.3	56	64.5	84.0	102.5	82.9	30.5	-0.47	0.638
Mingo														
White	104	53.0	66.0	80.5	68.0	23.0	87	48.0	67.0	88.5	68.0	26.3	0.02	0.984
Black	2	-----	-----	-----	68.0	0.0	8	36.5	47.0	71.5	53.8	18.4	2.08	0.076

Table 7-14 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY BY SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
TS (%)														
Greene/Humphreys														
White	15	16.4	20.4	25.0	21.3	6.9	16	16.9	20.9	25.4	21.7	6.5	-0.14	0.889
Black	76	14.6	19.5	24.2	19.8	6.7	70	13.4	19.0	24.0	18.7	7.4	0.95	0.343
St Clair														
Black	78	17.5	22.0	27.4	22.4	7.5	77	18.3	23.2	27.4	23.0	7.0	-0.52	0.601
Maricopa														
White	15	17.7	19.5	26.9	21.3	7.5	19	16.2	19.7	26.6	21.6	6.0	-0.12	0.903
Black	5	21.0	23.0	35.3	26.2	12.7	2	------	------	------	26.0	3.7	0.03	0.979
Hispanic	49	18.1	23.8	26.7	23.6	8.3	56	16.9	24.3	33.1	24.6	9.3	-0.58	0.564
Mingo														
White	101	15.6	19.8	26.1	21.1	7.5	81	16.0	21.1	27.4	21.4	8.1	-0.31	0.755
Black	4	21.7	26.2	30.3	26.0	5.2	7	14.9	16.4	21.9	18.3	6.2	2.21	0.063
FERRITIN (NG/DL)														
Greene/Humphreys														
White	15	15.0	21.0	25.0	20.5	7.8	14	15.0	25.5	39.0	25.9	12.4	-1.41	0.173
Black	76	16.5	23.5	33.5	25.5	11.5	65	15.0	23.0	32.0	26.2	11.8	-0.37	0.712
St Clair														
Black	83	17.5	25.0	35.0	30.9	34.8	79	19.0	27.0	35.0	29.6	15.4	0.33	0.742
Maricopa														
White	14	11.0	17.0	24.0	19.1	10.1	18	17.0	20.0	34.0	24.0	10.0	-1.37	0.181
Black	5	27.0	34.0	47.0	34.8	14.1	2	------	------	------	14.5	12.0	1.92	0.195
Hispanic	47	13.0	15.0	22.5	19.2	10.4	53	14.0	18.0	22.5	19.9	10.2	-0.34	0.733
Mingo														
White	98	13.0	17.0	23.0	18.8	8.6	84	15.0	21.0	32.0	24.6	12.9	-3.48	0.001
Black	4	17.5	23.0	29.0	23.3	6.7	8	24.0	34.0	38.0	33.3	13.3	-1.73	0.114
B-CAROTENE (MCG/DL)														
Greene/Humphreys														
White	13	86.0	109.0	132.0	109.2	31.3	12	72.5	103.5	129.0	102.0	33.4	0.56	0.579
Black	56	76.0	94.5	113.5	95.5	29.3	47	76.5	96.0	115.5	97.1	26.0	-0.28	0.779
Maricopa														
White	14	58.0	76.5	108.0	81.0	26.1	21	78.0	88.0	104.0	89.1	23.1	-0.95	0.353
Black	5	72.0	105.0	137.0	108.6	42.2	2	------	------	------	111.0	5.6	-0.12	0.907
Hispanic	50	85.0	102.0	115.0	100.5	26.9	53	75.5	94.5	114.5	96.4	26.3	0.71	0.479

Table 7-14 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES WITHIN ETHNICITY BY SITE

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
CHOLESTEROL (MG/DL)														
Greene/Humphreys														
White	14	150.0	166.0	184.0	169.2	24.5	19	144.5	169.0	188.5	171.4	31.0	-0.22	0.825
Black	85	155.0	172.0	189.0	171.0	30.9	75	143.5	163.0	184.0	165.1	31.8	1.18	0.241
St Clair														
Black	95	141.5	158.0	183.0	166.4	36.6	85	153.0	168.0	189.0	172.6	29.5	-1.26	0.208
Maricopa														
White	16	141.0	155.0	165.5	155.1	20.8	21	141.0	151.0	171.0	154.7	23.7	0.06	0.950
Black	5	134.0	170.0	191.0	167.2	40.6	3	-----	-----	-----	207.7	14.2	-2.03	0.098
Hispanic	51	152.0	164.0	179.0	164.4	27.6	55	136.5	149.0	172.0	160.2	32.8	0.72	0.471
Mingo														
White	106	135.0	157.5	172.0	155.5	25.9	96	138.0	155.0	167.0	153.6	28.6	0.49	0.624
Black	4	158.0	174.5	196.0	177.0	22.3	8	131.5	144.0	153.0	147.3	31.2	2.21	0.069
VITAMIN A (MCG/DL)														
Greene/Humphreys														
White	12	29.0	33.5	40.5	34.4	7.1	12	34.0	38.5	43.0	38.7	5.2	-1.68	0.108
Black	56	30.5	36.0	43.0	38.1	10.6	45	30.0	36.0	44.0	36.7	8.8	0.71	0.478
Maricopa														
White	14	33.0	36.0	38.0	36.1	3.8	20	33.0	37.0	43.0	38.0	6.6	-1.10	0.281
Black	5	30.0	36.0	39.0	34.6	5.4	1	-----	35.0	-----	35.0	-----	-0.17	0.876
Hispanic	50	32.0	37.0	42.0	36.9	7.5	53	31.0	35.0	38.0	34.8	7.6	1.38	0.171
VITAMIN C (MG/DL)														
Maricopa														
White	13	1.4	1.5	1.7	1.6	0.5	16	1.2	1.3	1.8	1.5	0.4	0.83	0.416
Black	5	1.2	1.5	1.6	1.5	0.5	1	-----	0.5	-----	0.5	-----	4.92	0.008
Hispanic	37	1.0	1.5	1.6	1.4	0.5	37	1.1	1.4	1.7	1.4	0.4	0.03	0.979

Table 7-15

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND BLACK CHILDREN ACROSS SITE

	WHITE						BLACK							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	285	36.0	37.5	39.0	37.6	2.3	379	34.0	35.5	37.0	35.6	2.3	11.25	0.000
HEMOGLOBIN (GM/DL)	280	12.7	13.2	13.8	13.2	0.8	378	12.0	12.5	13.3	12.6	1.0	8.54	0.000
FEP (MCG/DL)	275	11.0	17.0	21.0	17.4	8.0	375	14.0	19.0	25.0	20.5	9.6	-4.50	0.000
MCHC (%)	276	34.0	35.0	36.0	35.1	1.5	375	34.2	35.4	36.5	35.4	1.8	-2.57	0.010
TIBC (MCG/DL)	250	280.0	317.0	347.0	319.2	39.9	329	300.0	325.0	349.0	326.5	38.8	-2.19	0.029
SERUM IRON (MCG/DL)	261	53.0	67.0	86.0	69.3	24.4	339	52.0	67.0	87.0	69.1	25.1	0.11	0.911
TS (%)	247	16.1	20.2	26.1	21.3	7.4	320	16.0	20.8	25.7	21.2	7.4	0.24	0.812
FERRITIN (NG/DL)	243	14.0	19.0	27.0	21.7	10.9	322	18.0	25.5	35.0	28.3	21.0	-4.80	0.000
B-CAROTENE (MCG/DL)	60	70.0	92.0	113.5	94.2	28.2	110	76.0	96.0	117.0	97.1	29.0	-0.62	0.535
CHOLESTEROL (MG/DL)	272	139.0	157.0	173.5	156.5	27.0	360	147.0	166.5	187.5	168.7	32.4	-5.14	0.000
VITAMIN A (MCG/DL)	58	33.0	36.0	42.0	36.9	5.9	107	30.0	36.0	43.0	37.3	9.6	-0.32	0.749
VITAMIN C (MG/DL)	29	1.2	1.5	1.7	1.6	0.4	6	1.1	1.3	1.6	1.4	0.6	0.78	0.463

Table 7-15 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND BLACK CHILDREN WITHIN GREENE/HUMPHREYS COUNTY

	WHITE						BLACK							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	35	35.0	36.0	38.0	36.6	2.2	178	34.0	35.5	37.0	35.6	2.5	2.39	0.020
HEMOGLOBIN (GM/DL)	35	12.5	13.2	14.0	13.2	0.9	177	12.0	12.6	13.3	12.6	1.0	3.39	0.001
FEP (MCG/DL)	34	13.0	20.0	22.0	18.8	7.5	177	13.0	18.0	24.0	19.1	8.7	-0.22	0.826
MCHC (%)	35	35.1	36.3	36.7	36.1	1.7	177	34.4	35.5	36.6	35.5	1.7	1.88	0.066
TIBC (MCG/DL)	29	311.0	337.0	355.0	331.6	35.0	150	303.0	330.0	359.0	333.0	43.5	-0.18	0.857
SERUM IRON (MCG/DL)	32	53.5	64.0	84.5	69.4	21.7	158	48.0	63.0	82.0	65.0	24.3	1.03	0.306
TS (%)	31	16.9	20.5	25.2	21.5	6.5	146	14.0	19.3	24.1	19.3	7.0	1.68	0.101
FERRITIN (NG/DL)	29	15.0	21.0	30.0	23.1	10.5	141	18.0	23.0	32.0	25.8	11.6	-1.25	0.218
B-CAROTENE (MCG/DL)	25	80.0	108.0	130.0	105.8	31.9	103	76.0	96.0	115.5	96.3	28.6	1.37	0.180
CHOLESTEROL (MG/DL)	33	147.0	169.0	186.0	170.4	28.0	160	148.0	169.0	187.5	168.2	31.4	0.41	0.685
VITAMIN A (MCG/DL)	24	32.5	36.0	42.5	36.5	6.4	101	30.0	36.0	43.0	37.5	9.8	-0.58	0.562

Table 7-15 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START BLACK CHILDREN WITHIN ST.CLAIR COUNTY

	BLACK					
	N	Q1	MED	Q3	MEAN	SD
HEMATOCRIT (%)	181	34.0	35.5	37.0	35.4	2.2
HEMOGLOBIN (GM/DL)	181	12.0	12.5	13.1	12.6	1.0
FEP (MCG/DL)	178	15.0	19.5	27.0	21.9	10.0
MCHC (%)	180	34.1	35.5	36.6	35.5	1.8
TIBC (MCG/DL)	160	298.5	317.0	342.5	321.5	34.3
SERUM IRON (MCG/DL)	163	55.0	72.0	91.0	73.0	24.7
TS (%)	156	17.9	22.9	27.5	22.7	7.2
FERRITIN (NG/DL)	162	18.0	27.0	35.0	30.3	27.1
CHOLESTEROL (MG/DL)	180	146.0	164.0	185.0	169.3	33.5

Table 7-13 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND BLACK CHILDREN WITHIN MARICOPA COUNTY

	WHITE						BLACK							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	38	35.0	36.5	38.0	36.7	2.2	8	33.5	38.0	39.3	36.9	3.1	-0.18	0.863
HEMOGLOBIN (GM/DL)	38	12.7	13.0	13.5	13.1	0.7	8	11.9	12.6	13.3	12.5	0.9	1.61	0.143
FEP (MCG/DL)	38	18.0	19.5	24.0	21.2	5.5	8	11.0	15.5	27.5	20.0	11.0	0.30	0.775
MCHC (%)	37	34.8	35.6	36.2	35.5	1.3	7	33.2	33.6	34.2	33.7	0.7	5.78	0.000
TIBC (MCG/DL)	35	292.5	316.0	359.0	322.5	49.8	7	304.0	317.0	341.5	322.1	20.6	0.03	0.974
SERUM IRON (MCG/DL)	38	58.0	68.0	95.0	76.0	25.3	8	70.5	79.5	115.5	88.1	35.2	-0.92	0.379
TS (%)	34	16.2	19.6	27.5	21.5	6.6	7	22.0	23.4	32.0	26.2	10.4	-1.13	0.294
FERRITIN (NG/DL)	32	15.5	19.5	29.0	21.8	10.2	7	19.5	27.0	40.5	29.0	16.0	-1.14	0.283
B-CAROTENE (MCG/DL)	35	66.5	85.0	105.0	85.9	24.3	7	88.5	107.0	126.0	109.3	34.6	-1.71	0.131
CHOLESTEROL (MG/DL)	37	141.0	151.0	171.0	154.8	22.2	8	152.0	184.5	210.5	182.4	37.9	-1.98	0.083
VITAMIN A (MCG/DL)	34	33.0	36.0	40.0	37.2	5.7	6	30.0	35.5	39.0	34.7	4.8	1.17	0.274
VITAMIN C (MG/DL)	29	1.2	1.5	1.7	1.6	0.4	6	1.1	1.3	1.6	1.4	0.6	0.78	0.463

Table 7-15 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND BLACK CHILDREN WITHIN MINGO COUNTY

	WHITE						BLACK							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	212	36.5	38.0	39.5	37.8	2.2	12	35.8	37.3	38.5	37.0	2.2	1.35	0.201
HEMOGLOBIN (GM/DL)	207	12.7	13.3	13.8	13.2	0.8	12	12.4	13.1	13.4	13.0	1.0	0.84	0.416
FEP (MCG/DL)	203	10.0	15.0	20.0	16.5	8.3	12	9.5	16.0	29.0	20.2	12.5	-1.02	0.328
MCHC (%)	204	33.9	34.8	35.8	34.8	1.5	11	34.7	34.9	35.6	35.3	1.0	-1.34	0.205
TIBC (MCG/DL)	186	289.0	315.0	342.0	316.7	38.4	12	292.5	307.0	332.5	314.3	29.1	0.27	0.788
SERUM IRON (MCG/DL)	181	51.0	67.0	82.5	68.0	24.5	10	42.0	58.0	68.0	56.6	18.1	1.90	0.084
TS (%)	182	15.6	20.2	26.9	21.2	7.7	11	15.9	20.9	25.7	21.1	6.8	0.07	0.945
FERRITIN (NG/DL)	182	14.0	19.0	27.0	21.5	11.1	12	17.5	30.5	36.0	29.9	12.2	-2.33	0.038
CHOLESTEROL (MG/DL)	202	138.0	156.0	170.0	154.6	27.1	12	137.0	152.5	175.0	157.2	25.2	-0.35	0.735

Table 7-16

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND HISPANIC CHILDREN ACROSS SITE

	WHITE						HISPANIC							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	285	36.0	37.5	39.0	37.6	2.3	110	35.0	36.0	38.0	36.4	2.2	4.64	0.000
HEMOGLOBIN (GM/DL)	280	12.7	13.2	13.8	13.2	0.8	107	12.7	13.2	13.6	13.1	0.7	1.20	0.231
FEP (MCG/DL)	278	11.0	17.0	21.0	17.4	8.0	110	19.0	24.0	30.0	24.5	7.6	-8.17	0.000
MCHC (%)	276	34.0	35.0	36.0	35.1	1.0	107	35.3	35.8	36.6	35.9	1.8	-4.21	0.000
TIBC (MCG/DL)	250	290.0	317.0	347.0	318.2	39.9	104	309.5	343.0	378.5	344.4	46.1	-4.87	0.000
SERUM IRON (MCG/DL)	261	53.0	67.0	86.0	69.3	24.4	105	63.0	82.0	101.0	81.3	29.6	-3.62	0.000
TS (%)	247	16.1	20.2	26.1	21.3	7.4	106	17.6	24.0	30.1	24.0	8.9	-2.75	0.007
FERRITIN (NG/DL)	243	14.0	19.0	27.0	21.7	10.9	100	13.5	17.5	23.0	19.6	10.2	1.71	0.088
B-CAROTENE (MCG/DL)	60	70.0	92.0	113.5	94.2	28.2	102	76.0	96.0	115.0	98.4	29.0	-0.89	0.376
CHOLESTEROL (MG/DL)	272	139.0	157.0	173.5	156.5	27.0	107	139.5	158.0	176.0	162.0	30.3	-1.63	0.105
VITAMIN A (MCG/DL)	58	33.0	36.0	42.0	36.9	5.9	103	31.0	35.0	39.5	35.8	7.6	1.02	0.309
VITAMIN C (MG/DL)	29	1.2	1.5	1.7	1.6	0.4	74	1.0	1.5	1.7	1.4	0.4	1.82	0.075

Table 7-16 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN WHITE AND HISPANIC CHILDREN WITHIN MARICOPA COUNTY

	WHITE						HISPANIC							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	38	35.0	36.5	38.0	36.7	2.2	109	35.0	36.0	38.0	36.4	2.2	0.56	0.580
HEMOGLOBIN (GM/DL)	38	12.7	13.0	13.5	13.1	0.7	106	12.7	13.2	13.6	13.1	0.7	-0.22	0.827
FEP (MCG/DL)	38	18.0	19.5	24.0	21.2	5.5	109	19.0	24.0	30.0	24.5	7.6	-2.91	0.005
MCHC (%)	37	34.8	35.6	36.2	35.5	1.3	106	35.3	35.9	36.7	35.9	1.8	-1.45	0.150
TIBC (MCG/DL)	35	292.5	316.0	359.0	332.5	49.8	103	309.5	342.0	378.5	344.2	46.2	-2.27	0.027
SERUM IRON (MCG/DL)	38	58.0	68.0	95.0	76.0	25.3	104	63.0	82.0	101.5	81.6	29.4	-1.12	0.267
TS (%)	34	16.2	19.6	27.5	21.5	6.6	105	17.8	24.0	30.1	24.2	8.8	-1.86	0.066
FERRITIN (NG/DL)	32	15.5	19.5	29.0	21.8	10.2	98	13.5	17.0	22.5	19.6	10.3	1.10	0.278
B-CAROTENE (MCG/DL)	35	66.5	85.0	105.0	85.9	24.3	102	76.0	96.0	115.0	98.4	29.0	-2.49	0.015
CHOLESTEROL (MG/DL)	37	141.0	151.0	171.0	154.9	22.2	106	139.0	158.5	176.0	162.2	30.3	-1.57	0.121
VITAMIN A (MCG/DL)	34	33.0	36.0	40.0	37.2	5.7	103	31.0	35.0	39.5	35.8	7.6	1.13	0.260
VITAMIN C (MG/DL)	29	1.2	1.5	1.7	1.6	0.4	74	1.0	1.5	1.7	1.4	0.4	1.82	0.075

Table 7-17

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN BLACK AND HISPANIC CHILDREN ACROSS SITE

	BLACK						HISPANIC							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	379	34.0	35.5	37.0	35.6	2.3	110	35.0	36.0	38.0	36.4	2.2	-3.74	0.000
HEMOGLOBIN (GM/DL)	378	12.0	12.5	13.3	12.6	1.0	107	12.7	13.2	13.6	13.1	0.7	-5.56	0.000
FEP (MCG/DL)	375	14.0	19.0	25.0	20.5	9.6	110	19.0	24.0	30.0	24.5	7.6	-4.56	0.000
MCHC (%)	375	34.2	35.4	36.5	35.4	1.8	107	35.3	35.8	36.6	35.9	1.8	-2.53	0.012
TIBC (MCG/DL)	329	300.0	325.0	349.0	326.5	38.8	104	309.5	343.0	378.5	344.4	46.1	-3.60	0.000
SERUM IRON (MCG/DL)	339	52.0	67.0	87.0	69.1	25.1	105	63.0	82.0	101.0	81.2	29.6	-3.77	0.000
TS (%)	320	16.0	20.8	25.7	21.2	7.4	106	17.6	24.0	30.1	24.0	8.9	-2.98	0.003
FERRITIN (NG/DL)	322	15.0	25.5	35.0	28.3	21.0	100	13.5	17.5	23.0	19.6	10.2	5.57	0.000
B-CAROTENE (MCG/DL)	110	76.0	96.0	117.0	97.1	39.0	102	76.0	96.0	115.0	98.4	29.0	-0.33	0.744
CHOLESTEROL (MG/DL)	360	147.0	166.5	187.5	168.7	32.4	107	139.5	158.0	176.0	162.0	30.3	1.98	0.049
VITAMIN A (MCG/DL)	107	30.0	36.0	43.0	37.3	9.6	103	31.0	35.0	39.5	35.8	7.6	1.25	0.212
VITAMIN C (MG/DL)	6	1.1	1.3	1.6	1.4	0.6	74	1.0	1.5	1.7	1.4	0.4	-0.10	0.928

Table 7-17 (continued)

BIOCHEMICAL INDICATORS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN
WITH UNADJUSTED COMPARISONS BETWEEN BLACK AND HISPANIC CHILDREN WITHIN MARICOPA COUNTY

	BLACK						HISPANIC							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
HEMATOCRIT (%)	8	33.5	36.0	39.3	36.8	3.1	109	35.0	36.0	38.0	36.4	2.2	0.39	0.705
HEMOGLOBIN (GM/DL)	8	11.9	12.6	13.3	12.5	0.9	106	12.7	13.2	13.6	13.1	0.7	-1.76	0.117
FEP (MCG/DL)	8	11.0	15.5	27.5	20.0	11.0	109	19.0	24.0	30.0	24.5	7.6	-1.15	0.289
MCHC (%)	7	33.2	33.6	34.2	33.7	0.7	106	35.3	35.9	36.7	35.9	1.8	-7.49	0.000
TIBC (MCG/DL)	7	304.0	317.0	341.5	322.1	20.6	103	309.5	342.0	378.5	344.2	46.2	-2.45	0.032
SERUM IRON (MCG/DL)	8	70.5	79.5	115.5	88.1	35.2	104	63.0	82.0	101.5	81.6	29.4	0.51	0.624
TS (%)	7	22.0	23.4	32.0	26.2	10.4	105	17.8	24.0	30.1	24.2	8.8	0.90	0.634
FERRITIN (NG/DL)	7	19.5	27.0	40.5	29.0	16.0	99	13.5	17.0	22.5	19.6	10.3	1.54	0.174
B-CAROTENE (MCG/DL)	7	88.5	107.0	126.0	109.3	34.6	102	76.0	96.0	115.0	98.4	29.0	0.81	0.442
CHOLESTEROL (MG/DL)	8	152.0	194.5	210.5	187.4	37.9	106	139.C	158.5	176.0	162.2	30.3	1.47	0.180
VITAMIN A (MCG/DL)	6	30.0	35.5	39.0	34.7	4.8	103	31.0	35.0	39.5	35.8	7.6	-0.56	0.592
VITAMIN C (MG/DL)	6	1.1	1.3	1.6	1.4	0.6	74	1.0	1.5	1.7	1.4	0.4	-0.10	0.926

Table 7-18

Percentage of Children with Abnormal Levels on Biochemical Indicators at Posttest (Samples A, B, C) by Head Start Status

Biochemical Indicator		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		HS n=117	NHS n=96	HS n=102	NHS n=80	HS n=97	NHS n=58	HS n=118	NHS n=106	HS n=434	NHS n=340
Hematocrit	n	21/117	12/ 94	14/101	17/ 80	6/ 97	3/ 58	4/118	3/106	45/433	35/338
< 34.0%	%	17.9	12.8	13.9	21.3	6.2	5.2	3.4	2.8	10.4	10.4
Hemoglobin	n	4/117	0/ 97	1/101	2/ 80	1/ 98	0/ 56	0/115	4/105	6/429	6/335
< 11.0 gm/dl.	%	3.4	0	1.0	2.5	1.0	0	0	3.8	1.4	1.8
FEP	n	3/117	1/ 95	0/101[b]	6/ 79[b]	1/ 97	0/ 58	1/115	1/102	5/430	8/334
> 49 mcg/dl.	%	2.6	1.1	0	7.6	1.0	0	0.9	1.0	1.2	2.4
Serum Iron	n	16/109	8/ 84	3/ 89[b]	10/ 73[b]	7/ 95	4/ 58	1/115	1/102	42/401	31/312
< 40.0 mcg/dl.	%	14.7	9.5	3.4	13.7	7.4	6.9	14.8	9.3	10.5	9.9
TIBC	n	8/100	7/ 80	4/ 89	1/ 73	11/ 93	10/ 58	5/107	3/ 95	28/389	21/306
> 400 mcg/dl.	%	8.0	8.8	4.5	1.4	11.8	17.2	4.7	3.2	7.2	6.9
TS	n	34/100	20/ 80	12/ 85	15/ 71	17/ 93	10/ 58	31/102	20/ 95	94/380	65/304
< 16.0%	%	34.0	25.0	14.1	21.1	18.3	17.2	30.4	21.1	24.7	21.4
Ferritin	n	4/ 95	2/ 78	4/ 89	3/ 73	4/ 86	4/ 53	5/107	5/ 91	17/377	14/295
< 10.0 ng/ml.	%	4.2	2.6	4.5	4.1	4.7	7.5	4.7	5.5	4.5	4.7
Cholesterol	n	16/109	10/ 84	19/100	12/ 79	10/ 95	6/ 58	6/114	7/100	51/418	35/321
> 200 mg/dl.	%	14.7	11.9	19.0	15.2	15.0	10.3	5.3	7.0	12.2	10.9
Vitamin A	n	0/ 66	1/ 60			1/ 91	0/ 57			1/157	1/117
< 20.0 mcg/dl.	%	0	1.7	a	a	1.1	0	a	a	0.6	0.9
B-Carotene	n	10/ 66	14/ 60			12/ 91	14/ 57			22/157	28/117
< 70.0 mcg/dl.	%	15.2	23.3	a	a	13.2	24.6	a	a	14.0	23.9

[a] Not available because assays were not performed.

Table 7-19

Percentage of Children Considered Anemic by Four Sequential Definitions of Anemia at Posttest by Site

Definition of Anemia		Posttested Children (Samples A, B, C) in:			
		Greene & Humphreys Counties n=213	St. Clair County n=183	Maricopa County n=155	Mingo County n=224
Hemoglobin < 11.0	n	4/213	3/183	1/155	4/224
	%	1.9	1.6	0.6	1.8
Hemoglobin < 11.0 < 11.0 + FEP > 49.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0
Hemoglobin < 11.0 + FEP > 49.0 + Ferritin < 12.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0
Hemoglobin < 11.0 + FEP > 49.0 + Ferritin < 12.0 + TS < 16.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0
Hemoglobin < 10.5	n	3/213	1/183	1/155	2/224
	%	1.4	0.5	0.6	0.9
Hemoglobin < 11.0 < 10.5 + FEP > 49.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0
Hemoglobin < 10.5 + FEP > 49.0 + Ferritin < 12.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0
Hemoglobin < 10.5 + FEP > 49.0 + Ferritin < 12.0 + TS < 16.0	n	0	0	0	0
	%	0.0	0.0	0.0	0.0

Table 7-20

Percentage of Children with Abnormal Levels of Biochemical Indicators at Posttest (Samples A, B, C) by Site and Race

Biochemical Indicator		Posttested Children (Samples A, B, C) in:										
		Greene & Humphreys Counties		St. Clair County	Maricopa County			[illegible] County		All[b] Sites		
		White n=35	Black n=177	Black n=182	White n=38	Black n=8	Hispanic n=109	White n=212	Black n=12	White n=285	Black n=376	Hispanic n=110
Hematocrit < 34.0%	n %	3/ 35 8.6	30/176 17.0	31/180 17.2	2/ 38 5.3	2/ 8 25.0	5/109 4.6	6/212 2.8	1/ 12 8.3	11/285 3.9	64/376 17.0	5/110 4.5
Hemoglobin < 11.0 gm/dl.	n %	0/ 35 0	4/176 2.3	3/180 1.7	0/ 38 0	0/ 8 0	1/106 0.9	4/208 1.9	0/ 12 0	4/281 1.4	7/376 1.9	1/107 0.9
FEP > 49.0 mcg/dl.	n %	1/ 35 2.9	3/177 1.7	6/179 3.4	0/ 38 0	0/ 8 0	1/109 0.9	2/205 1.0	0/ 12 0	3/278 1.1	9/376 2.4	1/110 0.9
TIBC > 400 mcg/dl.	n %	2/ 31 6.5	13/149 8.7	5/161 3.1	4/ 37 10.8	0/ 7 0	17/107 15.9	8/190 4.2	0/ 12 0	14/258 5.4	18/329 5.5	17/108 15.7
Serum Iron < 40.0 mcg/dl.	n %	3/ 33 9.1	21/160 13.1	12/161 7.5	2/ 38 5.3	1/ 8 12.5	8/107 7.5	23/193 11.9	2/ 12 16.7	28/264 10.6	36/341 10.5	9/108 8.3
TS < 16.0%	n %	6/ 31 19.4	48/149 32.2	26/155 16.8	6/ 37 16.2	1/ 7 14.3	20/107 18.7	48/186 25.8	3/ 11 27.3	60/254 23.6	78/322 24.2	21/108 19.4
MCHC %.	n %	0/ 35 0.0	0/176 0.0	1/180 0.6	0/ 38 0.0	0/ 8 0.0	2/106 1.9	2/208 1.0	0/ 12 0.0	2/281 0.7	1/376 0.3	2/107 1.9
Ferritin < 10.0 ng/ml.	n %	1/ 30 3.3	5/143 3.5	7/161 4.3	1/ 32 3.1	1/ 7 14.3	6/100 6.0	10/186 5.4	0/ 12 0	12/248 4.8	13/323 4.0	6/101 5.9
Cholesterol > 200 mg/dl.	n %	6/ 34 17.6	20/159 12.6	31/178 17.4	0/ 38 0	3/ 8 37.5	13/107 12.1	12/202 5.9	1/ 12 8.3	18/274 6.7	55/357 15.4	13/108 12.0
Vitamin A < 20.0 mcg/dl.	n %	0/ 25 0	1/101 1.0	[a]	0/ 37 0	0/ 7 0	1/104 1.0	[a]	[a]	0/ 62 0.0	1/108 0.9	1/104 1.0
B-Carotene < 70.0 mcg/dl.	n %	5/ 25 20.0	19/101 18.8	[a]	10/ 37 27.0	1/ 7 14.3	15/104 14.4	[a]	[a]	15/ 62 24.2	20/108 18.5	15/104 14.4
Vitamin C mg/dl.	n %				0/ 29 0.0	0/ 6 0.0	0/ 74 0.0			0/ 29 0.0	0/ 6 0.0	0/ 74 0.0

[a] Not available because assays not performed.

[b] St. Clair County also had one Hispanic child shown only in summary of Hispanics in right-hand column.

Table 7-21

Means and Standard Deviations of Biochemical Indicators By Age Group and Site for Protected Children (Samples A & D)

Biochemical Indicator	Protected Children (Samples A & D) in:							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Kings County	
	2-4 yr. n=82	4-6 yr. n=10	2-4 yr. n=68	4-6 yr. n=41	2-4 yr. n=38	4-6 yr. n=59	2-4 yr. n=62	4-6 yr. n=11
Hematocrit %	36.3± 2.8	35.4± 2.5	36.4± 2.0	35.8± 3.3	36.2± 2.0	36.7± 1.8	37.2± 1.9	37.3± 2.6
Hemoglobin gm/dl.	12.3± 1.0	11.7± 0.7	11.7± 0.7	11.8± 1.1	12.7± 0.7	12.8± 0.6	12.5± 0.8	12.5± 1.3
FEP mcg/dl.	25.1±15.8	27.7±17.0	32.0±18.9	28.9±17.5	21.2± 6.2	21.5± 7.9	23.5±12.9	24.5±11.0
TIBC mcg/dl.	333.0±37.1	366.0±40.2	336.4±37.6[a]	347.0±44.9	330.9±74.1	333.9±32.2	343.7±66.4[a]	346.8±34.5
Serum Iron mcg/dl.	78.0±23.4	97.2±23.2	75.7±24.8	67.0±26.1	73.9±25.2	84.2±25.6	86.3±31.6	83.8±41.0
TS %	23.9± 7.5	25.8± 8.5	21.7± 7.1a	19.4± 7.8[a]	22.1± 7.5	25.2± 7.6	25.0±11.5	23.5±11.9
Ferritin ng/ml.	37.2±12.6	32.5±12.3	38.5±13.2	44.5±25.8	28.1±10.4	25.9± 9.6	30.0±12.6	38.0±16.3
Cholesterol mg/dl.	180.7±28.9	176.9±34.6	179.9±28.0	175.0±22.3	168.2±34.4	169.6±30.6	163.0±28.0	163.5±17.9
Vitamin A mcg/dl.	35.6±11.2	34.0± 6.2	36.0± 9.3[a]	33.0± 8.8	35.4± 5.4	38.0± 9.6	40.0±11.1[a]	29.3±12.2
B-carotene mcg/dl.	80.9±27.6	97.0±47.7	83.0±27.6[a]	89.7±27.3	83.6±28.0	77.6±20.2	75.5±25.2[a]	68.0±25.8

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[a] 20% or more missing data

[b] Results reported for all children, including those less than 2.5 years.

Table 7-22

Means and Standard Deviations of Biochemical Indicators By Age Group and Ethnicity for Pretreated Children (Samples A & B)

Biochemical Indicator	Pretreated Children (Samples A & B) by:					
	White		Black		Hispanic	
	2-4 yr. n=75	4-6 yr. n=23	2-4 yr. n=144	4-6 yr. n=33	2-4 yr. n=31	4-6 yr. n=40
Hematocrit %	36.0± 2.1	37.3± 2.3	36.4± 2.5	35.7± 3.1	36.5± 1.8	36.5± 1.5
Hemoglobin gm/dl.	12.4± 0.8	12.7± 1.0	12.0± 0.9	11.6± 1.0	12.8± 0.7	12.7± 0.6
FEP mcg/dl.	24.1±12.3	20.3± 8.8	29.0±17.9	28.2±17.0	22.4± 5.7	23.1± 8.5
TIBC mcg/dl.	341.5±63.2	329.7±26.7	343.5±38.5	348.0±42.7	332.5±33.0	330.4±35.5
Serum Iron mcg/dl.	83.4±30.6	81.1±32.3	77.3±24.0	71.8±26.3	76.4±26.1	83.9±27.4
TS %	25.0±10.9	24.3± 9.7	22.9± 7.4	120.± 8.2	22.9± 7.8	25.5± 8.0
Ferritin ng/ml.	30.3±12.0	31.6±14.0	38.0±12.9	42.1±23.6	29.0±20.1	25.0± 8.2
Cholesterol mg/dl.	164.4±26.7	166.1±23.2	180.5±28.7	178.0±29.9	170.4±37.3	167.5±24.6
Vitamin A mcg/dl.	30.4±10.8	39.4±12.1	35.0±10.6	35.± 8.2	35.± 5.2	37.2± 9.3
B-carotene mcg/dl.	66.9±25.4	65.3±26.2	82.6±27.6	91.6±32.0	85.0±28.3	79.4±25.5

Table 7-23

Unadjusted Means and Standard Deviations of Biochemical Indicators by Site and Head Start Status at Posttest (Samples A, B, C)

Biochemical Indicator	Posttest Children (Samples A, B, C) In:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Kings County		All Sites	
	HS n=117	NHS[b] n=94	HS n=102	NHS n=81	HS n=97	NHS[b] n=58	HS n=118	NHS n=106	HS n=434	NHS n=341
Hematocrit % n	35.3± 2.7 117	36.0± 2.0 94	35.5± 1.8 100	35.4± 2.0 80	36.5± 2.1 97	36.5± 2.4 58	37.0± 2.0 118	38.2± 2.4 105	36.3 ± 2.4 432	36.5 ± 2.4 338
Hemoglobin gm/dl. n	12.6± 1.0 116	12.9± 0.9 94	12.6± 0.9 101	12.6± 0.8 79	13.1± 0.8 96	13.0± 0.7 56	13.2± 0.8 115	13.2± 0.9 104	12.9 ± 0.9 428	12.9 ± 0.9 333
FEP mcg/dl. n	18.8± 8.4 115	19.3± 8.6 94	21.1± 9.1 101	22.7±11.0 76	23.5± 7.8 97	23.5± 7.0 58	16.5± 7.9 114	16.8± 9.3 101	19.8 ± 8.6 427	20.1 ± 9.5 329
Serum Iron mcg/dl. n	63.7±23.5 106	68.8±24.3 82	75.6±24.6 88	69.0±25.2 73	77.6±27.0 93	85.5±29.6 56	65.2±26.5 106	69.9±26.0 95	327 ± 41 381	326 ± 41 299
TIBC mcg/dl. n	334±42 98	331±41 78	326±37 88	318±31 71	338±42 87	338±34 58	313±38 106	318±37 92	70.0 ± 25.7 393	72.3 ± 26.1 306
TS % n	19.0± 7.1 87	20.7± 6.9 78	23.0± 6.6 84	21.8± 7.8 71	22.6± 8.2 88	25.3± 8.7 57	20.7± 7.7 101	21.8± 7.6 92	21.2 ± 7.6 371	22.2 ± 7.8 298
MCHC % n	35.3± 1.6 115	35.7± 1.9 94	35.6± 1.9 98	35.5± 1.7 80	35.3± 1.7 95	35.7± 1.7 53	34.9± 1.4 115	34.8± 1.4 102	35.4 ± 1.7 423	35.4 ± 1.7 331
Ferritin ng/ml. n	24.0±10.7 93	24.7±11.9 75	29.8±15.7 88	26.9±13.9 73	21.1±11.0 86	19.6±10.3 52	22.6±12.1 105	21.3±10.4 89	24.3 ± 12.9 372	23.8 ± 12.1 289
Cholesterol mg/dl. n	167±32 107	171±70 84	169±32 100	170±35 78	163±29 93	159±30 58	158±26 114	153±30 100	166 ± 30 414	163 ± 32 321
Vitamin A mcg/dl. n	37.1±10.5 65	37.7± 7.7 58	a	a	35.8± 7.1 87	36.6± 7.0 56	a	a	36.4 ± 8.7 152	37.2 ± 7.4 114
B-Carotene mcg/dl. n	105.5±31.8 66	90.1±26.7** 60	a	a	99.3±27.6 87	90.6±29.7 57	a	a	102.0 ± 29.6 153	90.3 ± 27.1** 117
Vitamin C mg/dl. n	a	a	a	a	1.5± 0.5 70	1.3± 0.4* 39	a	a	1.5 ± 0.5 70	1.3 ± 0.4* 39

[a] Not available because assays were not performed.

[b] Significance indicated as:
*p ≤ .05
**p ≤ .01

Table 7-24

Unadjusted Means and Standard Deviations of Biochemical Indicators by Site and Race at Posttest (Samples A, B, C)

Biochemical Indicator	Posttested Children (Samples A, B, C) in:										
	Greene & Humphreys Counties		St. Clair County	Maricopa County			Mingo County		All^b Sites		
	White n=36	Black n=177	Black n=182	White n=38	Black n=8	Hispanic n=109	White n=212	Black n=12	White n=286	Black n=379	Hispanic n=110
Hematocrit % n	36.6± 2.2 35	35.6± 2.3 176	35.4± 1.9 179	36.7± 2.2 38	36.9± 3.1 6	36.4± 2.2 109	37.9±2.2 212	37.0±2.3 12	37.6± 2.3 285	35.6± 2.3 375	36.4± 2.2 110
Hemoglobin gm/dl. n	13.2± 0.9 35	12.6± 1.0 175	12.6± 0.9 179	13.1± 0.7 38	12.5± 0.9 6	13.1± 0.7 106	13.2±0.8 207	13.0±1.0 12	13.2± 0.8 280	12.6± 0.9 374	13.1± 0.7 107
FEP mcg/dl. n	18.[illegible]± 7.3 34	19.1± 8.7 175	21.0±10.0 176	21.2± 5.6 38	20.0±11.0 6	24.6± 7.6 109	16.4±6.3 203	20.2±12.5 12	17.4± 8.0 275	20.4± 9.5 371	24.5± 7.6 110
TIBC mcg/dl. n	332 ±35 29	333 ±63	321 ±34 159	322 ±30 35	322 ±21 7	344 ±46	317 ±38 186	314 ±29 12	319 ±40 250	326 ±39 316	344 ±46 104
Serum Iron mcg/dl. n	69.4±21.7 32	65.2±24.3 156	72.8±24.9 151	76.0±25.3 38	88.1±35.2 8	81.6±29.4	68.0±24.5 191	56.6±18.1 10	69.3±24.6 261	61.9±25.1 333	81.2±29.6 105
TS % n	21.3± 6.5 31	19.4± 7.1 144	22.6± 7.1 136	21.3± 6.6 36	26.2±10.4 7	24.2± 8.8 105	21.2±7.7 182	21.1±6.8 11	21.3± 7.4 247	121.2± 7.3 316	24.0± 8.9 106
MCHC % n	36.1± 1.7 35	35.5± 1.7 175	35.4± 1.8 178	35.5± 1.3 37	33.7± 0.6 7	35.0± 1.8 106	34.8±1.5 204	35.3±1.0 11	35.1± 1.5 276	35.4± 1.8 371	35.9± 1.8 107
Ferritin ng/ml. n	23.1±10.5 29	25.6±11.5 137	28.5±13.0 160	21.8±10.2 32	29.0±16.0 7	19.6±10.3 99	21.5±11.1	29.9±12.2	21.7±10.9 243	27.3±13.5 318	19.6±10.2 100
Cholesterol gm/dl. n	170 ±28 33	168±31 158	169 ±34 176	155 ±22 37	182 ±38 8	162 ±30 106	154 ± 27 202	157 ± 25 12	156 ±27 272	169 ±32 356	162 ±30 107
Vitamin A mcg/dl. n	36.5± 6.4 34	37.6± 9.8 98	a	37.2± 5.7 34	34.7± 4.8 6	35.8± 7.6 103	a	a	36.9± 6.0 58	37.4± 9.6 105	35.8± 7.6 103
B-Carotene mcg/dl. n	105.8±31.9 25	96.2±28.9 101	a	85.9±26.3 33	109.3±34.6 7	98.4±29.0 102	a	a	94.2±29.2 60	97.1±29.0 108	98.4±29.0 102
Vitamin C mg/dl. n	a	a	a	1.6 ± 0.4 29	1.4± 0.6 6	1.4 ± 0.4 74	a	a	1.6± 0.4 29	1.4± 0.6 6	1.4± 0.4 74

[a] Not available because assays not performed.

[b] Overall differences among ethnic groups are statistically significant (p < .001) for all biochemical indicators except Vitamins A & C and B-carotene.

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Table 7-25

Unadjusted Means and Standard Deviations of Biochemical Indicators by Site, Race and Head Start Status at Posttest (Samples A, B, C)

Biochemical Indicator	Posttested Children (Samples A, B, C) In:					
	Greene & Humphreys Counties				St. Clair County	
	White		Black		Black	
	HS n=17	NHS n=19	HS n=100	NHS n=77	HS n=102	NHS n=80
Hematocrit	36.2± 2.2	36.9± 2.1	35.4± 2.8	35.9± 2.0	35.5± 1.8	35.3± 2.0
% n	17	18	100	76	100	79
Hemoglobin	12.8± 0.8	13.5± 0.8	12.6± 1.0	12.7± 0.8	12.6± 0.9	12.6± 0.8
gm/dl. n	17	18	99	76	101	78
FEP	19.3± 8.2	18.4± 6.8	18.7± 8.4	19.5± 9.0	21.1± 9.1	22.7±11.1
mcg/dl. n	17	17	98	77	101	75
TIBC	337 ±30	326 ±40	334 ±44	332 ±42	324 ±37	319 ±31
mcg/dl. n	14	15	85	63	89	70
Serum Iron	65.7±22.9	72.3±20.9	63.3±23.7	67.8±25.2	75.6±24.6	69.5±25.0
mcg/dl. n	14	18	92	64	89	72
TS	20.8± 8.5	22.2± 4.1	18.6± 6.8	20.3± 7.4	23.0± 6.6	22.0± 7.7
% n	15	16	82	62	84	70
MCHC	35.4± 1.5	36.7± 1.7	35.5± 1.6	35.4± 1.8	35.4± 1.9	35.5± 1.7
% n	17	18	99	76	99	79
Ferritin	22.5± 9.4	23.7±11.8	24.2±11.0	27.4±11.9	29.8±15.7	26.9±14.0
ng/ml. n	15	14	78	61	88	72
Cholesterol	163 ± 29	176 ±27	167 ±33	169 ±30	169 ±32	170 ±35
mg/dl. n	15	18	92	66	100	78
Vitamin A	35.5± 7.1	38.0± 5.4	37.6±11.3	37.7± 8.2	a	a
mcg/dl. n	14	10	51	48		
B-Carotene	111.1±27.6	98.6±36.7	103.9±33.0	88.2±21.2	a	a
mg/dl. n	14	11	52	49		

[a] Not available because assays not performed.

Table 7-25 (continued)

Unadjusted Means and Standard Deviations of Biochemical Indicators by Site, Race and Head Start Status at Posttest (Samples A, B, C)

Biochemical Indicators	Posttested Children (Samples A, B, C) In:									
	Maricopa County						Mingo County			
	White		Black		Hispanic		White		Black	
	HS n=27	NHS n=11	HS n=6	NHS n=2	HS n=64	NHS n=45	HS n=107	NHS n=105	HS n=11	NHS n=1
Hematocrit n (%)	36.5± 2.4 27	37.0± 1.8 11	38.0± 2.7 6	33.5± 0.7 2	36.4± 1.9 64	36.5± 2.5 45	37.7± 2.0 107	38.1± 2.4 105	36.7± 2.0 11	40.5 1
Hemoglobin n (gm/dl.)	13.1± 0.8 27	13.0± 0.5 11	12.8± 0.9 6	11.9± 0.3 2	13.1± 0.7 63	13.0± 0.8 43	13.2± 0.7 104	13.2± 0.9 103	12.9± 1.0 11	14.1 1
FEP n (mcg/dl.)	20.1± 4.6 27	23.8± 6.9 11	20.0±12.3 6	20.0± 9.9 2	25.3± 7.9 64	23.5± 7.1 45	16.0± 7.1 103	16.9± 9.3 100	21.2±12.5 11	9.0 1
TIBC n (mcg/dl.)	323±47 24	321±58 11	322±19 5	323±33 2	345±40 58	343±54 45	315±40 95	318±37 91	313±30 11	329 1
Iron (mcg/dl.)	74.5±24.3 27	79.6±28.6 11	91.0±41.0 6	79.5± 9.2 2	77.4±28.0 59	87.2±30.5 45	66.1±25.0 96	69.9±24.0 95	56.6±18.1 10	NA[a] 0
TS (%)	20.7± 6.6 24	23.4± 6.5 10	26.7±12.4 5	24.9± 5.4 2	23.0± 8.4 60	25.8± 9.3 45	20.8± 7.9 91	21.7± 7.6 91	20.3± 6.6 10	29.2 1
MCHC (%)	35.7± 1.4 26	35.2± 0.8 11	33.6± 0.6 6	34.4± ? 1	36.0± 1.8 63	35.9± 1.8 43	34.9± 1.5 103	34.8± 1.4 101	35.3± 1.1 10	34.8 1
Ferritin (ng/ml.)	21.4±10.7 22	22.8± 9.5 10	32.8±17.7 5	19.5± 5.0 2	20.0±10.1 59	18.9±10.7 40	21.8±11.8 94	21.2±10.5 [illegible]	30.1±12.8 11	28.0 1
Cholesterol (mg/dl.)	160±21 26	144±22 11	190±34 6	161±56 2	162±30 61	163±30 45	157±25 103	152±29 99	153±22 11	201 1
Vitamin A (mg/dl.)	36.5± 4.9 23	38.7± 7.1 11	33.6± 4.5 5	40.0 1	35.8± 8.0 59	35.9± 7.0 44	a	a	a	a
B-Carotene (mcg/dl.)	89.8±24.4 24	77.4±23.0 11	115.6±37.2 5	93.5±30.4 2	101.9±27.3 58	93.8±30.8 44	a	a	a	a
Vitamin C (mcg/dl.)	1.6± 0.5 20	1.4± 0.3 9	1.4± 0.6 5	1.1 1	1.4± 0.5 45	1.3± 0.4 29	a	a	a	a

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[a] Not available because assays not performed.

Table 7-25 (continued)

Unadjusted Means and Standard Deviations of Biochemical Indicators by Head Start Status and Race, Across Sites at Posttest (Samples A, B, C)

Biochemical Indicator		Posttested Children (Sampler A, B, C) by:					
		All Sites					
		White		Black		Hispanic	
		HS n=151	NHS n=135	HS n=219	NHS n=160	HS n=64	NHS n=46
Hematocrit (%)		37.3 ± 2.2	37.9 ± 2.3	35.6 ± 2.4	35.6 ± 2.0	36.4 ± 1.9	36.5 ± 2.4
	n	151	134	217	158	64	46
Hemoglobin (gm/dl.)		13.1 ± 0.8	13.2 ± 0.8	12.6 ± 1.0	12.6 ± 0.8	13.1 ± 0.7	13.0 ± 0.8
	n	148	132	217	157	63	44
FEP (mcg/dl.)		17.1 ± 7.0	17.7 ± 9.0	10.0 ± 9.1	21.0 ± 10.1	25.3 ± 7.9	23.4 ± 7.1
	n	147	128	216	155	64	46
TIBC (mcg/dl.)		319 ± 41	320 ± 39	328 ± 40	325 ± 37	345 ± 40	344 ± 53
	n	133	117	190	136	58	46
Serum Iron (mcg/dl.)		67.8 ± 24.7	71.1 ± 24.0	69.4 ± 25.4	68.8 ± 24.9	77.4 ± 28.0	86.0 ± 31.2
	n	137	124	197	138	59	46
TS (%)		20.8 ± 7.7	21.9 ± 7.1	21.0 ± 7.2	21.3 ± 7.6	23.0 ± 8.4	25.4 ± 9.5
	n	130	117	181	135	60	46
MCHC (%)	n	35.1 ± 1.5	35.1 ± 1.6	35.4 ± 1.7	35.5 ± 1.8	36.0 ± 1.8	35.9 ± 1.8
		146	130	214	157	63	44
Ferritin (ng/ml.)	n	21.8 ± 11.3	21.6 ± 10.5	27.5 ± 14.0	27.0 ± 13.0	20.0 ± 10.1	19.0 ± 10.6
		131	112	182	136	59	41
Cholesterol (mg/dl.)	n	158 ± 24	155 ± 30	168 ± 32	170 ± 33	162 ± 30	162 ± 30
		144	128	209	147	61	46
Vitamin A (%)	n	36.1 ± 5.7	38.4 ± 6.2	37.2 ± 10.9	37.7 ± 8.1	35.8 ± 8.0	35.9 ± 7.0
		37	21	56	49	59	44
B-Carotene (mcg/dl.)	n	97.8 ± 27.3	88.0 ± 31.8	104.9 ± 33.2	88.4 ± 21.3	101.9 ± 27.4	93.8 ± 30.8
		38	22	57	51	58	44
Vitamin C (mg/dl.)	n	1.6 ± 0.5	1.4 ± 0.3	1.4 ± 0.6	1.1 ± 0.0	1.4 ± 0.5	1.3 ± 0.4
		20	9	3	1	43	29

Table 7-26

Percentage of Head Start Children Receiving A Hematocrit or Hemoglobin Screen by Head Start with Abnormal Hematocrit or Hemoglobin at Posttest

Hematological Screen		Posttested Children (Samples A, B, C) in:									
		Greene & Humphreys Counties n=127		St. Clair County n=108		Maricopa County n=102		Mingo County n=112		All Sites n=449	
Hematocrit Screen		Yes 47	No 80	Yes 57	No 51	Yes 83	No 19	Yes 78	No 34	Yes 265	No 184
Abnormal Hematocrit at Posttest	n	5/ 46	17/ 78	8/ 56	7/ 49	4/ 82	2/ 19	2/ 78	2/ 34	19/262	28/180
	%	10.9	21.8	14.3	14.3	4.9	10.5	2.6	2.9	7.3	15.6
	χ^2	p = 0.12		p = 1.00		p = 0.35		p = 0.38		p = 0.005	
Hemoglobin Screen		Yes 37	No 90	Yes 57	No 51	Yes 18	No 84	Yes 78	No 34	Yes 190	No 259
Abnormal Hemoglobin at Posttest	n	0/ 37	4/ 88	1/ 56	0/ 49	1/ 18	0/ 82	0/ 76	0/ 33	2/187	4/248
	%	0.0	4.5	1.8	0.0	5.6	0.0	0.0	0.0	1.1	1.6
	χ^2	p = 0.19		p = 0.35		p = 0.03				p = 0.64	

Table 7-27

Regression Analysis of Hematocrit and Hemoglobin, Across Sites Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
HEMATOCRIT	185	Greene & Humphreys	0.40	0.56
		St. Clair	-0.58	0.60
		Maricopa	-0.16	0.67
		Mingo	0.34	0.72
		Program		
		Head Start	-0.36	0.32
		Constant	18.61	
	Statistics[c]	F = 8.98 R^2 = 0.34 MS_e = 4.26		
		Site		
HEMOGLOBIN	184	Greene & Humphreys	0.25	0.20
		St. Clair	0.37	0.22
		Maricopa	-0.44	0.24
		Mingo	-0.17	0.26
		Program		
		Head Start	-0.51	0.12
		Constant	6.87	
	Statistics[c]	F = 8.85 R^2 = 0.34 MS_e = 0.56		

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-28

Regression Analysis of Free Erythrocyte Protoporphyrin and Total Iron Binding Capacity, Across Sites
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
FEP	182	Greene & Humphreys	-0.36	1.98
		St. Clair	1.58	2.12
		Maricopa	0.99	2.37
		Mingo	-2.54	2.52
		Program		
		Head Start	1.75	1.13
		Constant	9.07	
		Statistics[c] F = 12.45 R^2 = 0.42 MS_e = 52.34		
		Site		
TIBC	148	Greene & Humphreys	13.38	12.38
		St. Clair	-7.70	13.40
		Maricopa	-7.02	13.47
		Mingo	1.34	16.05
		Program		
		Head Start	3.95	6.80
		Constant	183.16	
		Statistics[c] F = 3.83 R^2 = 0.22 MS_e 1521.86		

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-29

Regression Analysis of Serum Iron and Transferrin Saturation, Across Sites Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
IRON	160	Greene & Humphreys	-2.01	6.80
		St. Clair	-3.33	7.54
		Maricopa	-0.82	8.07
		Mingo	6.16	8.90
		Program		
		Head Start	-1.58	4.10
		Constant	45.19	
	Statistics[c]	F = 2.77	R^2 = 0.16	MS_e = 610.63
		Site		
TS	147	Greene & Humphreys	-0.74	2.25
		St. Clair	-0.63	2.54
		Maricopa	0.62	2.65
		Mingo	0.76	2.93
		Program		
		Head Start	-1.41	1.40
		Constant	14.61	
	Statistics[c]	F = 1.77	R^2 = 0.12	MS_e = 64.88

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-30

Regression Analysis of Serum, Ferritin and Cholesterol, Across Sites
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
FERRITIN	154	Greene & Humphreys	-6.77	3.30
		St. Clair	-1.90	3.58
		Maricopa	6.71	3.98
		Mingo	1.96	4.38
		Program		
		Head Start	-2.37	2.01
		Constant	11.92	
	Statistics[c]	F = 3.57	R^2 = 0.20	MS_e = 141.34
		Site		
CHOLESTEROL	168	Greene & Humphreys	13.85	8.40
		St. Clair	12.27	8.95
		Maricopa	-6.07	10.21
		Mingo	-20.04	9.92
		Program		
		Head Start	0.40	4.34
		Constant	66.61	
	Statistics[c]	F = 6.10	R^2 = 0.28	MS_e = 721.49

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-31

Regression Analysis of Hematocrit, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
HEMATOCRIT	65					
		Head Start	-0.16	0.53	F =	5.41
		Constant	13.56		MS_e	4.36
		St. Clair				
HEMATOCRIT	38					
		Head Start	0.29	0.68	F =	1.12
		Constant	22.58		MS_e	4.02
		Maricopa				
HEMATOCRIT	50					
		Head Start	-0.86	0.70	F =	1.76
		Constant	14.16		MS_e	4.62
		Mingo				
HEMATOCRIT	32					
		Head Start	-0.84	0.85	F =	0.45
		Constant	31.94		MS_e	5.07

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-32

Regression Analysis of Hemoglobin, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistic[c]	
		Greene & Humphreys				
HEMOGLOBIN	66	Head Start	-0.28E-01	0.24	F =	2.79
		Constant	6.14		MS_e	0.85
		St. Clair				
HEMOGLOBIN	37	Head Start	-0.21	0.26	F =	1.71
		Constant	6.02		MS_e	0.60
		Maricopa				
HEMOGLOBIN	50	Head Start	0.73E-01	0.15	F =	6.21
		Constant	6.99		MS_e	0.23
		Mingo				
HEMOGLOBIN	31	Head Start	-0.79E-01	0.32	F =	1.36
		Constant	7.11		MS_e	0.62

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-33

Regression Analysis of Free Erythrocyte Protoporphyrin, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
FEP	64					
		Head Start	1.88	1.61	F =	6.44
		Constant	5.65		MS_e	37.54
		St. Clair				
FEP	37					
		Head Start	3.88	3.56	F =	5.37
		Constant	12.85		MS_e	92.46
		Maricopa				
FEP	51					
		Head Start	2.11	1.77	F =	7.07
		Constant	10.32		MS_e	29.86
		Mingo				
FEP	30					
		Head Start	-1.62	3.57	F =	1.93
		Constant	-2.44		MS_e	80.74

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-34

Regression Analysis of Total Iron Binding Capacity, by Site Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
TIBC	51	Head Start	9.55	11.12	F = 2.46
		Constant	163.08		MS_e 1303.14
		St. Clair			
TIBC	26	Head Start	-8.55	11.52	F = 2.38
		Constant	112.29		MS_e 846.77
		Maricopa			
TIBC	50	Head Start	0.98	13.37	F = 1.56
		Constant	197.71		MS_e 2274.35
		Mingo			
TIBC	21	Head Start	-2.73	17.87	F = 1.89
		Constant	191.64		MS_e 1054.37

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-35

Regression Analysis of Serum Iron
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]	
		Greene & Humphreys				
IRON	38	Head Start	-4.38	5.46	F =	1.04
		Constant	57.51		MS_e	396.28
		St. Clair				
IRON	28	Head Start	5.82	10.11	F =	0.94
		Constant	9.80		MS_e	641.75
		Maricopa				
IRON	30	Head Start	-2.67	9.66	F =	1.42
		Constant	19.10		MS_e	909.20
		Mingo				
IRON	34	Head Start	6.46	12.84	F =	1.02
		Constant	35.97		MS_e	654.89

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-36

Regression Analysis of Transferrin Saturation, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
TS	52				
		Head Start	-2.85	2.07	F = 1.59
		Constant	20.11		MS_e 47.60
		St. Clair			
TS	23				
		Head Start	0.79	3.35	F = 1.02
		Constant	4.03		MS_e 55.14
		Maricopa			
TS	50				
		Head Start	-1.04	2.85	F = 1.52
		Constant	1.48		MS_e 79.48
		Mingo			
TS	22				
		Head Start	0.15	4.74	F = 1.10
		Constant	10.31		MS_e 79.37

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-37

Regression Analysis of Serum Ferritin, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
FERRITIN	51				
		Head Start	0.79	2.23	F = 5.13
		Constant	-0.87		MS_e 58.10
		St. Clair			
FERRITIN	31				
		Head Start	-2.42	0.13	F = 3.62
		Constant	6.32		MS_e 103.92
		Maricopa			
FERRITIN	48				
		Head Start	-4.39	4.67	F = 1.29
		Constant	36.40		MS_e 199.53
		Mingo			
FERRITIN	24				
		Head Start	0.24	9.12	F = 0.28
		Constant	27.94		MS_e 311.86

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-38

Regression Analysis of Serum Cholesterol, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]	
		Greene & Humphreys				
CHOLESTEROL	58					
		Head Start	0.34	7.60	F =	3.60
		Constant	52.71		MS_e	770.07
		St. Clair				
CHOLESTEROL	35					
		Head Start	5.08	9.14	F =	2.77
		Constant	68.93		MS_e	638.36
		Maricopa				
CHOLESTEROL	49					
		Head Start	-3.30	9.89	F =	2.82
		Constant	32.97		MS_e	947.96
		Mingo				
CHOLESTEROL	26					
		Head Start	3.52	11.15	F =	1.17
		Constant	128.0		MS_e	562.82

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-39

Regression Analysis of Serum Vitamin A, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]	
		Greene & Humphreys				
VITAMIN A	35					
		Head Start	-1.60	3.13	F =	2.25
		Constant	9.02		MS_e	75.96
		Maricopa				
VITAMIN A	45					
		Head Start	9.83	17.95	F =	0.19
		Constant	46.83		MS_e	2883.37

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-40

Regression Analysis of B-Carotene, by Site
Longitudinal Data

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se_b	
		Greene & Humphreys			
CAROTENE	37				
		Head Start	8.38	9.12	F = 3.63
		Constant	13.73		MS_e 655.60
		Maricopa			
CAROTENE	48				
		Head Start	5.14		F = 5.32
		Constant	42.81		MS_e 709.87

[a] Adjusted for gender, race, mother's education, income percentile, and pretest value.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-41

Regression Analysis of Hematocrit and Hemoglobin, Across Sites
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
HEMATOCRIT	729	Greene & Humphreys	-0.53**	0.19
		St. Clair	-0.67**	0.23
		Maricopa	-0.18	0.17
		Mingo	1.14***	0.22
		Program		
		Head Start	-0.18	0.17
		Constant	36.32	
		Statistics[c] F = 17.12 R^2 = 0.18 MS_e = 4.95		
		Site		
HEMOGLOBIN	722	Greene & Humphreys	-0.28E-01	0.07
		St. Clair	-0.84E-01	0.09
		Maricopa	-0.28E-01	0.11
		Mingo	0.14	0.08
		Program		
		Head Start	-0.20E-01	0.07
		Constant	12.89	
		Statistics[c] F = 9.49 R^2 = 0.10 MS_e = 0.74		

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e

Table 7-42

Regression Analysis of Free Erythrocyte Protoporphyrin and Total Iron Binding Capacity, Across Sites Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se[b]
		Site		
FEP	716	Greene & Humphreys	-1.04	0.75
		St. Clair	1.55	0.89
		Maricopa	1.87	1.10
		Mingo	-2.38	0.86
		Program		
		Head Start	-0.55	0.66
		Constant	21.49	
		Statistics[c] $F = 7.72$ $R^2 = 0.09$ $MS_e = 75.65$		
		Site		
TIBC	644	Greene & Humphreys	9.94**	3.69
		St. Clair	-1.49	4.34
		Maricopa	-1.62	5.34
		Mingo	-6.83	4.17
		Program		
		Head Start	1.70	3.23
		Constant	323.54	
		Statistics[c] $F = 4.56$ $R^2 = 0.06$ $MS_e = 1615.70$		

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e

Table 7-43

Regression Analysis of Serum Iron and Transferrin Saturation, Across Sites Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se[b]
		Site		
IRON	662	Greene & Humphreys	-4.72*	2.28
		St. Clair	1.22	2.74
		Maricopa	7.27*	3.27
		Mingo	3.76	2.63
		Program		
		Head Start	-2.59	2.03
		Constant	64.98	
	Statistics[c]	F = 4.67	R^2 = 0.05	MS_e = 654.33
		Site		
TS	632	Greene & Humphreys	-1.71*	0.70
		St. Clair	0.83	0.83
		Maricopa	1.00	1.02
		Mingo	-0.12	0.79
		Program		
		Head Start	-1.00	0.61
		Constant	19.30	
	Statistics[c]	F = 3.57	R^2 = 0.05	MS_e = 58.09

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS^e is residual mean square.

Table 7-44

Regression Analysis of Mean Corpuscular Hemoglobin Concentration and Serum Ferritin, Across Sites
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se[b]
		Site		
MCHC	715	Greene & Humphreys	0.47**	0.14
		St. Clair	0.33	0.17
		Maricopa	-0.17	0.22
		Mingo	-0.63***	0.17
		Program		
		Head Start	0.40E-01	0.13
		Constant	26.05	
	Statistics[c]	$F = 4.20$	$R^2 = 0.05$	$MS_e = 2.78$
		Site		
FERRITIN	625	Greene & Humphreys	-1.22	0.86
		St. Clair	2.17*	1.02
		Maricopa	not entered into the equation	
		Mingo	-0.94	1.26
		Program		
		Head Start	0.66	0.98
		Constant	27.59	
	Statistics[c]	$F = 7.71$	$R^2 = 0.10$	$MS_e = 144.92$

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e

Table 7-45

Regression Analysis Vitamin A and B-Carotene, Across Sites
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
VITAMIN A	255	Greene & Humphreys	0.47E-01	0.94
		Maricopa	-0.46E-01	0.95
		Program		
		Head Start	-0.65	1.03
		Constant	35.54	
		Statistics[c] F = 0.70	R^2 = 0.02	MS_e = 65.70
		Site		
CAROTENE	259	Greene & Humphreys	6.61*	3.16
		Maricopa	-6.61*	3.16
		Program		
		Head Start	12.60**	3.54
			30.65	
		Statistics[c] F = 2.75	R^2 = 0.02	MS_e = 786.93

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-46

Regression Analysis of Hematocrit by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
		Greene & Humphreys			
HEMATOCRIT	203	Head Start	-0.53	0.35	F = 1.35
		Constant	35.42		MS_e = 6.10
		St. Clair			
HEMATOCRIT	163	Head Start	0.23	0.06	F = 1.00
		Constant	35.36		MS_e = 3.65
		Maricopa			
HEMATOCRIT	150	Head Start	not entered in the equation		F = 0.68
		Constant	36.89		MS_e = 5.01
		Mingo			
HEMATOCRIT	213	Head Start	-0.37	0.32	F = 1.16
		Constant	37.23		MS_e = 4.92

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-47

Regression Analysis of Hemoglobin, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
HEMOGLOBIN	202					
		Head Start	-0.22	0.14	F =	2.03
		Constant	12.76		MS_e	0.92
		St. Clair				
HEMOGLOBIN	163					
		Head Start	0.18	0.14	F =	2.36
		Constant	11.42		MS_e	0.76
		Maricopa				
HEMOGLOBIN	148					
		Head Start	0.73	0.13	F =	1.33
		Constant	12.80		MS_e	0.56
		Mingo				
HEMOGLOBIN	209					
		Head Start	0.27E-01	0.12	F =	0.70
		Constant	13.31		MS_e	0.69

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-48

Regression Analysis of Total Iron Binding Capacity, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
TIBC	169	Head Start	2.57	6.60	F =	0.07
		Constant	330.46		MS_e	1804.45
		St. Clair				
TIBC	145	Head Start	4.66	5.94	F =	0.96
		Constant	332.02		MS_e	1221.56
		Maricopa				
TIBC	140	Head Start	2.34	8.19	F =	1.59
		Constant	317.49		MS_e	2166.83
		Mingo				
TIBC	190	Head Start	-4.10	5.85	F =	0.83
		Constant	299.81		MS_e	1406.09

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-49

Regression Analysis of Serum Iron, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
IRON	180					
		Head Start	-4.98	3.67	F =	0.90
		Constant	60.46		MS_e	582.81
		St. Clair				
IRON	146					
		Head Start	6.17	4.18	F =	1.42
		Constant	40.00		MS_e	618.51
		Maricopa				
IRON	145					
		Head Start	-7.27	5.07	F =	0.82
		Constant	80.49		MS_e	846.43
		Mingo				
IRON	191					
		Head Start	-2.37	3.83	F =	1.24
		Constant	40.56		MS_e	600.84

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-50

Regression Analysis of Transferrin Saturation, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
TS	167					
		Head Start	-1.74	1.11	F =	1.34
		Constant	17.17		MS_e	49.44
		St. Clair				
TS	140					
		Head Start	1.01	1.22	F =	1.67
		Constant	8.65		MS_e	50.85
		Maricopa				
TS	141					
		Head Start	-2.57	1.50	F =	1.34
		Constant	23.86		MS_e	72.46
		Mingo				
TS	184					
		Head Start	-0.52	1.22	F =	0.73
		Constant	15.81		MS_e	59.88

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-51

Regression Analysis of Mean Corpuscular Hemoglobin Concentration, by Site Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]	
		Greene & Humphreys				
MCHC	202					
		Head Start	-0.88	0.25	F =	0.73
		Constant	36.07		MS_e	3.08
		St. Clair				
MCHC	162					
		Head Start	-0.16	0.28	F =	2.66
		Constant	31.84		MS_e	3.04
		Maricopa				
MCHC	146					
		Head Start	0.10	0.29	F =	2.78
		Constant	34.70		MS_e	2.77
		Mingo				
MCHC	205					
		Head Start	0.22	0.22	F =	0.83
		Constant	35.89		MS_e	2.12

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-52

Regression Analysis of Serum Ferritin, By Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
		Greene & Humphreys			
FERRITIN	161	Head Start	-3.08	1.80	F = 0.93
		Constant	25.75		MS_e 126.60
		St. Clair			
FERRITIN	146	Head Start	2.23	2.60	F = 0.42
		Constant	27.72		MS_e 238.20
		Maricopa			
FERRITIN	133	Head Start	1.59	1.87	F = 1.66
		Constant	28.24		MS_e 104.20
		Mingo			
FERRITIN	185	Head Start	2.22	1.67	F = 7.13
		Constant	44.53		MS_e 112.35

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-53

Regression Analysis of Serum Cholesterol, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]	
		Greene & Humphreys				
CHOLESTEROL	183					
		Head Start	-4.11	4.65	F	= 0.69
		Constant	174.75		MS_e	951.83
		St. Clair				
CHOLESTEROL	162					
		Head Start	31.07	27.52	F	= 0.54
		Constant	292.20		MS_e	26812.26
		Maricopa				
CHOLESTEROL	146					
		Head Start	2.98	5.09	F	= 1.61
		Constant	170.10		MS_e	855.43
		Mingo				
CHOLESTEROL	205					
		Head Start	3.00	4.03	F	= 0.26
		Constant	150.26		MS_e	721.56

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-54

Regression Analysis of Vitamin A, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se_b	
		Greene & Humphreys			
VITAMIN A	117				
		Head Start	-0.74	1.68	F = 2.43
		Constant	31.89		MS_e 79.03
		Maricopa			
VITAMIN A	138				
		Head Start	-0.52	1.26	F = 0.88
		Constant	37.09		MS_e 49.75

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-55

Regression Analysis of B-Carotene, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	se_b		
		Greene & Humphreys				
CAROTENE	120					
		Head Start	14.41*	5.15	F =	2.74
		Constant	82.05		MS_e	766.62
		Maricopa				
CAROTENE	139					
		Head Start	11.34*	4.92	F =	2.74
		Constant	74.90		MS_e	771.83

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 7-56

Regression Analysis of Vitamin C, by Site
Samples A, B, C

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]	
		Maricopa				
VITAMIN C	105					
		Head Start	0.18	0.09	F =	1.80
		Constant	1.16		MS_e	0.20

[a] Adjusted for gender, race, mother's education, and income percentile.

[b] Centered without weights.

[c] MS_e is residual mean square.

CHAPTER EIGHT

APPENDIX TABLES

Table 8-1

Mean Percentile Ranks for Boys and Girls
on the McCarthy Motor Scale for Various Samples of Children[a]

Sample		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Pretest: (Samples A,D)	$\underline{n}$	45	49	54	55	50	45	33	37	182	186
	$\bar{x}$	33.4	30.7	10.8	21.6	16.6	29.0	15.5	29.2	18.9	27.3**
	s.d	28.9	26.8	15.1	21.9	18.0	25.7	30.0	30.0	22.9	25.6
Posttest: (Samples A,B,C)	$\underline{n}$	112	116	104	90	81	86	118	110	415	402
	$\bar{x}$	36.6	38.7	47.4	51.7	25.6	30.1	27.4	35.7	34.6	38.9**
	s.d.	27.7	27.7	32.3	27.0	24.0	26.1	24.0	27.3	28.5	30.0
Pretest: (Sample A)	$\underline{n}$	36	37	24	15	27	29	18	18	104	99
	$\bar{x}$	36.1	30.7	13.3	20.9	16.1	28.6	18.0	31.8	23.5	29.5
	s.d.	28.7	26.2	14.4	21.9	16.5	24.2	19.7	22.2	24.8	26.7
Posttest: (Sample A)	$\underline{n}$	37	37	27	15	27	29	17	18	109	99
	$\bar{x}$	34.8	35.6	55.9	46.5	31.3	31.0	22.9	35.6	36.4	35.2
	s.d.	24.0	23.1	34.6	26.9	27.3	27.0	28.5	34.4	29.7	24.9

[a] Significance shown as:
** $p < .01$

Table 8-3

Average Number of Refusals for the Development Evaluation by Age Group

Age Group		Pretested Children (Samples A, D) in:			
		Greene & Humphreys Counties n=95	St. Clair County n=113	Maricopa County n=95	Mingo County n=73
< 2.25	n		1		3
	Mean		1.00		16.67
	S.D.		0.0		27.15
2.25-2.74	n	14	16		13
	Mean	12.21	13.31		25.23
	S.D.	21.75	17.06		20.90
2.75-3.24	n	28	27		21
	Mean	8.50	7.41		14.62
	S.D.	17.57	10.25		19.34
3.25-3.74	n	36	18	20	17
	Mean	5.14	5.61	4.50	4.59
	S.D.	14.64	9.34	10.87	9.34
3.75-4.24	n	8	19	50	11
	Mean	6.62	9.53	.82	8.82
	S.D.	18.33	14.61	2.97	16.56
4.25-4.74	n	5	19	25	6
	Mean	.20	7.26	.60	.33
	S.D.	.45	16.09	2.80	.82
4.75-5.24	n	4	11		1
	Mean	13.25	2.09		0.0
	S.D.	25.84	6.93		0.0
5.25-5.74	n		2		1
	Mean		0.0		0.0
	S.D.		0.0		0.0

Table 8-4:

Correlations Between McCarthy Motor Scale and Age for Various Samples of Children

Sample		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Pretest:	n	95	109	95	70	346
(Samples A,D)	r	-.39**	-.21*	-.08	-.02	-.22**
Posttest:	n	228	194	167	228	817
(Samples A,B,C)	r	-.00	-.21**	.05	-.23**	-.17**
Pretest:	n	66	38	56	32	192
(Sample A)	r	-.35**	-.07	-.18	.08	-.19*
Posttest:	n	74	42	56	36	208
(Sample A[b])	r	-.18	-.20	.13	-.01	-.12

[a] Significance indicated as:
* for $p < .01$
** for $p < .001$

[b] Sample A including children with many refusals at pretest.

Table 8-5

Correlations Between Number of Refusals on McCarthy Motor Scale and Child's Age for Various Samples of Children[a]

Sample		Greene & Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites
Pretest: (Samples A,D)	n	95	113	95	73	376
	r	-.12	-.18	-.22*	.40***	-.28***
Posttest: (Samples A,B,C)	n	228	194	167	228	817
	r	-.23***	-.24***	-.04	-.24***	-.25***
Pretest: (Sample A)	n	74	42	56	36	208
	r	-.19*	-.16	-.22*	-.30*	-.28***
Posttest: (Sample A)	n	74	42	56	36	208
	r	-.09	-.19	-.05	-.34*	-.20**

[a] Significance indicated as:
* for p < .05
** for p < .01
*** for p < .001

Table 8-6

PRETEST AND POSTTEST DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN IN SAMPLE A WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE														
Greene/Humphreys														
Pretest	36	15.00	35.00	60.00	40.44	29.40	30	15.00	30.00	55.00	34.76	22.70	0.89	0.379
Posttest	43	20.00	40.00	57.50	38.74	23.60	31	10.00	25.00	45.00	30.26	22.50	1.57	0.122
St Clair														
Pretest	24	3.00	10.00	20.00	13.67	13.60	14	3.00	20.00	35.00	23.79	22.30	-1.54	0.141
Posttest	25	25.00	45.00	80.00	49.04	31.00	17	35.00	70.00	85.00	57.65	33.90	-0.84	0.409
Maricopa														
Pretest	40	3.00	17.50	40.00	22.20	20.00	16	3.00	5.00	42.50	23.38	25.70	-0.16	0.871
Posttest	40	7.50	22.50	45.00	30.20	25.80	16	10.00	25.00	50.00	33.50	30.20	-0.38	0.704
Mingo														
Pretest	17	5.00	15.00	25.00	21.76	23.70	15	7.50	35.00	80.00	43.87	36.90	-1.99	0.059
Posttest	18	5.00	12.50	25.00	18.50	18.70	18	5.00	30.00	55.00	31.28	23.40	-1.81	0.079

PRETEST AND POSTTEST DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN IN SAMPLE A WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE														
Pretest	117	5.00	20.00	40.00	26.00	24.80	75	5.00	25.00	55.00	32.11	27.20	-1.57	0.118
Posttest	126	10.00	30.00	55.00	35.18	26.80	82	10.00	35.00	55.00	36.79	28.50	-0.41	0.684

Table 8-6 (continued)

PRETEST AND POSTTEST DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN IN SAMPLE A WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE														
Greene/Humphreys														
Pretest	43	7.50	25.00	57.50	34.02	30.60	31	15.00	25.00	55.00	33.68	23.10	0.06	0.956
Posttest	43	20.00	40.00	57.50	38.74	23.60	31	10.00	25.00	45.00	30.26	22.50	1.57	0.122
St Clair														
Pretest	24	3.00	10.00	20.00	13.67	13.60	16	2.00	17.50	30.00	20.94	22.20	-1.17	0.253
Posttest	25	25.00	45.00	80.00	49.04	31.00	17	35.00	70.00	85.00	57.65	33.90	-0.84	0.409
Maricopa														
Pretest	40	3.00	17.50	40.00	22.20	20.00	16	3.00	5.00	42.50	23.38	25.70	-0.16	0.871
Posttest	40	7.50	22.50	45.00	30.20	25.80	16	10.00	25.00	50.00	33.50	30.20	-0.38	0.704
Mingo														
Pretest	18	5.00	15.00	25.00	20.61	23.50	17	1.00	35.00	75.00	38.82	37.30	-1.72	0.098
Posttest	18	5.00	12.50	25.00	18.50	18.70	18	5.00	30.00	55.00	31.28	23.40	-1.81	0.079
McCARTHY REFUSALS														
Greene/Humphreys														
Pretest	43	0.00	0.00	2.50	9.09	19.20	31	0.00	0.00	0.00	3.61	11.10	1.55	0.127
Posttest	43	0.00	0.00	1.00	0.77	1.76	31	0.50	1.00	2.00	3.58	8.76	-1.76	0.087
St Clair														
Pretest	24	0.00	3.00	10.50	6.08	7.32	16	0.50	2.50	20.50	13.19	18.60	-1.45	0.164
Posttest	25	1.00	1.00	4.00	2.48	2.73	17	1.00	2.00	4.00	2.59	2.09	-0.15	0.885
Maricopa														
Pretest	40	0.00	0.00	0.00	0.85	3.54	16	0.00	0.00	0.50	3.63	10.60	-1.03	0.319
Posttest	40	0.00	0.00	0.00	0.40	1.35	16	0.00	0.00	0.00	0.31	0.87	0.29	0.776
Mingo														
Pretest	18	0.00	3.00	9.00	8.33	14.20	17	0.00	2.00	8.00	9.82	17.40	-0.28	0.784
Posttest	18	0.00	0.00	1.00	1.17	2.04	18	0.00	0.00	1.00	1.94	5.08	-0.60	0.553

Table 8-6 (continued)

PRETEST AND POSTTEST DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN IN SAMPLE A WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD.	N	Q1	MED	Q3	MEAN	SD	T	P
AGGRESSIVE CHILD INDEX														
Greene/Humphreys														
Pretest	42	1.38	1.75	2.13	1.83	0.58	30	1.63	2.00	2.50	2.08	0.63	-1.73	0.089
Posttest	40	1.63	2.00	2.50	2.03	0.62	28	1.63	1.75	2.25	1.99	0.53	0.31	0.755
St Clair														
Pretest	25	1.88	2.25	3.13	2.51	0.85	17	2.13	2.63	3.25	2.54	0.70	-0.11	0.915
Posttest	24	1.63	2.06	2.50	2.02	0.55	16	1.44	2.00	2.50	2.03	0.72	-0.05	0.960
Maricopa														
Pretest	40	1.94	2.38	2.88	2.48	0.74	16	2.13	2.50	2.88	2.57	0.64	-0.44	0.659
Posttest	39	2.25	2.63	2.88	2.52	0.52	16	1.69	2.31	3.19	2.40	0.90	0.48	0.638
Mingo														
Pretest	17	2.50	2.88	3.00	2.76	0.40	17	2.25	2.38	2.75	2.59	0.61	0.96	0.347
Posttest	18	2.00	2.25	3.00	2.58	0.85	17	1.63	2.13	2.75	2.16	0.67	1.66	0.107
WITHDRAWN CHILD INDEX														
Greene/Humphreys														
Pretest	43	1.00	1.29	1.50	1.28	0.27	29	1.14	1.29	1.57	1.43	0.48	-1.53	0.134
Posttest	35	1.00	1.29	1.64	1.39	0.38	28	1.00	1.29	1.29	1.32	0.37	0.79	0.433
St Clair														
Pretest	25	1.29	1.43	2.00	1.72	0.63	16	1.43	1.71	2.00	1.75	0.42	-0.21	0.834
Posttest	23	1.00	1.29	1.78	1.47	0.51	17	1.29	1.57	2.14	1.68	0.54	-1.28	0.209
Maricopa														
Pretest	39	1.43	1.86	2.29	1.89	0.58	16	1.43	1.86	2.00	1.82	0.62	0.35	0.726
Posttest	39	1.71	2.00	2.57	2.16	0.58	15	1.57	2.14	2.29	1.89	0.55	1.60	0.121
Mingo														
Pretest	18	1.29	1.29	1.57	1.44	0.39	18	1.14	1.36	1.71	1.52	0.48	-0.60	0.555
Posttest	18	1.29	1.57	1.86	1.66	0.53	18	1.00	1.43	1.71	1.55	0.60	0.59	0.557

Table 8-6 (continued)

PRETEST AND POSTTEST DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN IN SAMPLE A WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE														
Pretest	125	3.00	15.00	40.00	24.40	24.70	80	4.00	25.00	55.00	30.16	27.40	-1.52	0.129
Posttest	126	10.00	30.00	55.00	35.18	26.80	82	10.00	35.00	55.00	36.79	28.50	-0.41	0.684
McCARTHY REFUSALS														
Pretest	125	0.00	0.00	4.00	5.77	13.40	80	0.00	0.00	3.50	6.85	14.50	-0.54	0.593
Posttest	126	0.00	0.00	1.00	1.05	2.04	82	0.00	1.00	2.00	2.38	6.02	-1.93	0.057
AGGRESSIVE CHILD INDEX														
Pretest	124	1.75	2.25	2.81	2.31	0.76	80	1.88	2.38	2.75	2.39	0.67	-0.78	0.436
Posttest	121	1.88	2.25	2.63	2.27	0.66	77	1.63	2.00	2.63	2.12	0.69	1.48	0.140
WITHDRAWN CHILD INDEX														
Pretest	125	1.29	1.43	1.86	1.58	0.54	79	1.29	1.43	1.86	1.60	0.52	-0.23	0.818
Posttest	115	1.29	1.57	2.00	1.71	0.60	78	1.14	1.43	1.86	1.56	0.54	1.81	0.072

Table 8-7

Average McCarthy Developmental Percentile Scores by Age Group

Age Group	Longitudinal (Sample A) Children In:							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Pretest n=66	Posttest n=74	Pretest n=38	Posttest n=42	Pretest n=56	Posttest n=56	Pretest n=32	Posttest n=36
2.25-2.74								
Mean S.D.								
2.75-3.24								
Mean S.D.								1 35.00 0.00
3.25-3.74	10	13	5	8			4	6
Mean S.D.	56.50 15.10	30.00 22.82	22.60 12.30	71.62 24.60			40.25 42.11	22.00 21.90
3.75-4.24	21	23	13	13			12	12
Mean S.D.	43.38 24.53	32.17 22.69	12.85 7.64	39.85 28.13			30.33 30.25	30.08 17.94
4.25-4.74	23	25	7	7	9	9	9	9
Mean S.D.	38.70 28.25	31.00 21.79	13.71 17.59	63.00 37.20	27.78 24.98	23.89 18.84	32.89 26.90	17.33 23.89
4.75-5.24	6	7	8	9	30	30	3	4
Mean S.D.	13.67 13.65	42.57 24.14	27.12 27.1	51.44 34.71	23.00 22.53	30.53 27.46	7.00 7.21	22.00 23.08
5.25-5.74	4	4	2	2	17	17	4	4
Mean S.D.	10.75 6.99	19.50 18.36	5.50 6.36	37.50 10.61	19.00 18.38	36.06 29.74	46.50 50.42	31.00 33.74
5.75-6.24	2	2	3	3				
Mean S.D.	4.00 1.41	31.50 40.31	19.00 31.18	45.33 44.50				
≥ 6.25								
Mean S.D.								

Table 8-8

Average Number of Refusals for the Developmental Evaluation by Age Group

Age Group	Longitudinal (Sample A) Children In:							
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County	
	Pretest n=74	Posttest n=74	Pretest n=42	Posttest n=42	Pretest n=56	Posttest n=56	Pretest n=36	Posttest n=36
< 2.25								
Mean								
S.D.								
2.25-2.74								
Mean								
S.D.								
2.75-3.24							1	1
Mean							48.00	2.00
S.D.							0.00	0.00
3.25-3.74	13	13	8	8			6	6
Mean	13.15	.62	16.00	3.37			20.00	4.17
S.D.	22.35	.77	17.08	3.14			25.17	7.91
3.75-4.24	23	23	13	13			12	12
Mean	6.65	4.47	8.69	3.15			7.67	2.17
S.D.	15.88	10.20	12.05	2.94			10.60	3.30
4.25-4.74	25	25	7	7	9	9	9	9
Mean	5.00	.84	3.14	1.71	6.22	.00	1.67	.11
S.D.	14.51	.90	5.18	1.50	13.95	.00	2.83	.33
4.75-5.24	7	7	9	9	30	30	4	4
Mean	7.57	.43	10.11	1.78	.70	.60	22.00	.50
S.D.	19.59	.53	17.45	1.71	3.12	1.61	23.21	1.00
5.25-5.74	4	4	2	2	17	17	4	4
Mean	.25	2.25	6.00	3.00	.88	.18	.50	0.0
S.D.	.50	3.20	4.24	1.41	3.39	.53	1.00	0.0
5.75-6.24	2	2	3	3				
Mean	0.0	0.00	7.67	1.33				
S.D.	0.0	0.00	13.27	2.31				
6.25-6.74								
Mean								
S.D.								

Table 8-9

Regression Analysis of Developmental Assessment Measures Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
MCCARTHY MOTOR SCALE PERCENTILE	193	Site			
		Greene & Humphreys	-7.00	7.57	F = 3.98
		St. Clair	13.21	8.11	R^2 = .20
		Maricopa	3.11	7.95	MS_e = 599.9
		Mingo	-9.33	8.10	
		Program			
		Head Start	-3.30	2.36	
		Non-Head Start	3.30	2.36	
		Head Start in Greene & Humphreys	8.14*	3.81	
		Constant	25.54		
MCCARTHY REFUSALS INDEX	198	Site			
		Greene & Humphreys	-.50	1.24	F = 2.85
		St. Clair	.29	1.32	R^2 = .14
		Maricopa	-.31	1.31	MS_e = 16.23
		Mingo	.51	1.32	
		Program			
		Head Start	-.001	.38	
		Non-Head Start	.001	.38	
		Head Start in Greene & Humphreys	-1.45**	.63	
		Constant	8.03		

[a] Adjusted for age, gender, race, per capita income, family employment status, mother's education, and child's pretest score.

[b] Centered without weights.

[c] Significance
  *p < .05
  **p < .01
  ***p < .001

Table 8-9 (continued)

Regression Analysis of Developmental Assessment Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Site			
WITHDRAWN CHILD INDEX	181	Greene & Humphreys	-.38**	.14	F = 15.89***
		St. Clair	-.38**	.14	R^2 = .48
		Maricopa	.58***	.14	MS_e = .18
		Mingo	.17	.14	
		Program			
		Head Start	.04	.03	
		Non-Head Start	-.04	.03	
		Constant	.62		
		Site			
AGGRESSIVE CHILD INDEX	185	Greene & Humphreys	-.18	.18	F = 6.18*
		St. Clair	-.33	.19	R^2 = .26
		Maricopa	.37*	.19	MS_e = .33
		Mingo	.12	.19	
		Program			
		Head Start	.06	.05	
		Non-Head Start	-.06	.05	
		Constant	1.47		

[a] Adjusted for age, gender, race, per capita income, family employment status, mother's education, and child's pretest score.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

Table 8-9 (continued)

Regression Analysis of Developmental Assessment Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
McCARTHY MOTOR SCALE PERCENTILE	60	Head Start	6.13*	2.71	F = 3.25
					R^2 = .30
		Constant	35.36		MS_e = 374.4
		St. Clair			
	31	Head Start	5.37	5.90	F = 1.19
					R^2 = .23
		Constant	8.25		MS_e = 863.64
		Maricopa			
	52	Head Start	did not enter		F = 2.28
					R^2 = .23
		Constant	-108.79		MS_e = 635.5
		Mingo			
	26	Head Start	-8.52	4.87	F = 2.49
					R^2 = .44
		Constant	-2.70		MS_e = 423.12

[a] Adjusted for age, gender, race, per capita income, family employment status, mother's education, and child's pretest score.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

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Table 8-9 (continued)

Regression Analysis of Developmental Assessment Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se_b	
		Greene & Humphreys			
McCARTHY REFUSALS INDEX	61	Head Start	-1.37	.63	F = 1.37
					R^2 = .15
		Constant	4.39		MS_e = 20.02
		St. Clair			
	32	Head Start	.19	.52	F = 1.26
					R^2 = .23
		Constant	13.10		MS_e = 6.37
		Maricopa			
	52	Head Start	-.05	.11	F = .91
					R^2 = .13
		Constant	-1.81		MS_e = .41
		Mingo			
	26	Head Start	.47	.31	F = .93
					R^2 = .23
		Constant	3.27		MS_e = 2.04

[a] Adjusted for age, gender, race, per capita income, family employment status, mother's education, and child's pretest score.

[b] Centered without weights.

[c] Significance
*p < .05
**p < .01
***p < .001

Table 8-9 (continued)

Regression Analysis of Developmental Assessment Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
AGGRESSIVE CHILD INDEX	53	Head Start	.08	.08	F = 1.74
					R^2 = .19
		Constant	1.87		MS_e = .20
		St. Clair			
	30	Head Start	.02	.10	F = 1.35
					R^2 = .26
		Constant	2.51		MS_e = .24
		Maricopa			
	52	Head Start	.06	.09	F = 4.15
					R^2 = .36
		Constant	.74		MS_e = .32
		Mingo			
	23	Head Start	.23	.16	F = 3.07
					R^2 = .48
		Constant	.93		MS_e = .32

[a] Adjusted for age, gender, race, per capita income, family employment status, mother's education, and child's pretest score.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

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Table 8-9 (continued)

Regression Analysis of Developmental Assessment Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
WITHDRAWN CHILD INDEX	51	Head Start	.03	.06	F = .49
					R^2 = .06
		Constant	1.35		MS_e = .14
		St. Clair			
WITHDRAWN CHILD INDEX	30	Head Start	-.25*	.10	F = 1.44
					R^2 = .23
		Constant	1.26		MS_e = .27
		Maricopa			
WITHDRAWN CHILD INDEX	51	Head Start	.15	.09	F = 1.76
					R^2 = .19
		Constant	.44		MS_e = .30
		Mingo			
WITHDRAWN CHILD INDEX	26	Head Start	.08	.09	F = 1.79
					R^2 = .31
		Constant	.28		MS_e = .16

[a] Adjusted for age, gender, race, per capita income, family employment status, and mother's education.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

Table 8-10

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se_b	
		Site			
McCARTHY MOTOR SCALE PERCENTILE	776	Greene & Humphreys	-1.47	1.67	F = 13.39***
		St. Clair	13.21***	1.96	R^2 = 0.15
		Maricopa	-5.90*	2.12	MS_e = 694.3
		Mingo	-5.84**	1.75	
		Program			
		Head Start	-.66	1.15	
		Non-Head Start	.66	1.15	
		Head Start in Greene & Humphreys	10.34***	2.14	
		Constant	55.69		
		Site			
McCARTHY REFUSALS INDEX	776	Greene & Humphreys	0.94**	0.30	F = 12.03
		St. Clair	1.04**	0.36	R^2 0.14
		Maricopa	-0.93*	0.38	MS_e 22.74
		Mingo	-1.11**	.31	
		Program			
		Head Start	-.19	.21	
		Non-Head Start	.19	.21	
		Head Start in Greene & Humphreys	1.78***	.39	
		Constant	8.78		

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

Table 8-10 (continued)

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
WITHDRAWN CHILD INDEX	776	Site			
		Greene & Humphreys	-.29	.03	F = 16.87
		St. Clair	-0.12*	0.04	R^2 = 0.17
		Maricopa	0.36***	0.04	MS_e = 0.28
		Mingo	.07*	0.04	
		Program			
		Head Start	.009	.02	
		Non-Head Start	-.009	.02	
		Constant	1.47		
AGGRESSIVE CHILD INDEX	779	Site			
		Greene & Humphreys	-0.31***	0.04	F = 11.39
		St. Clair	-0.06	0.05	R^2 = 0.12
		Maricopa	0.25***	0.05	MS_e = 0.45
		Mingo	.17***	.04	
		Program			
		Head Start	.004	.03	
		Non-Head Start	-.004	.03	
		Constant	2.64		

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

Table 8-10 (continued)

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
		Greene & Humphreys			
McCARTHY MOTOR SCALE PERCENTILE	220	Head Start	9.97***	1.84	F = 7.35*
					R^2 = 0.17
		Constant	52.71		MS_e = 642.6
		St. Clair			
	177	Head Start	.97	2.32	F = 1.83
					R^2 = 0.06
		Constant	117.86		MS_e = 891.85
		Maricopa			
	162	Head Start	-2.43	2.04	F = 2.39
					R^2 = 0.08
		Constant	3.61		MS_e = 604.27
		Mingo			
	217	Head Start	0.21	1.83	F = 4.47
					R^2 = 0.11
		Constant	40.02		MS_e = 619.55

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
*p < .05
**p < .01
***p < .001

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Table 8-10 (continued)

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b	Statistics[c]
		Greene & Humphreys			
McCARTHY REFUSALS INDEX	220	Head Start	-1.92***	.53	F = 5.02
					R^2 = 0.12
		Constant	14.48		MS_e = 54.31
		St. Clair			
	177	Head Start	-0.54	0.35	F = 2.28
					R^2 = 0.08
		Constant	9.00		MS_e = 20.22
		Maricopa			
	162	Head Start	-0.06	0.10	F = 0.48
					R^2 = 0.02
		Constant	-0.84		MS_e = 1.40
		Mingo			
	217	Head Start	-0.16	0.22	F = 4.00
					R^2 = 0.09
		Constant	7.70		MS_e = 8.90

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
*$p < .05$
**$p < .01$
***$p < .001$

Table 8-10 (continued)

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] se_b	Statistics[c]
		Greene & Humphreys			
AGGRESSIVE CHILD INDEX	204	Head Start	-.09*	0.05	F = 1.74
					R^2 = 0.05
		Constant	2.57		MS_e = 0.37
		St. Clair			
	170	Head Start	-0.10	0.05	F = 2.11
					R^2 = 0.07
		Constant	2.92		MS_e = 0.46
		Maricopa			
	139	Head Start	too small to enter		F = 1.72
					R^2 = 0.05
		Constant	3.95		MS_e = 0.50
		Mingo			
	211	Head Start	.0001	0.05	F = 1.35
					R^2 = 0.04
		Constant	3.00		MS_e = 0.43

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
*p < .05
**p < .01
***p < .001

Table 8-10 (continued)

Regression Analysis of Developmental Assessment Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	se_b	
		Greene & Humphreys			
WITHDRAWN CHILD INDEX	203	Head Start	-.003	0.03	F = 0.59
					R^2 = 0.02
		Constant	1.15		MS_e = 0.19
		St. Clair			
	167	Head Start	-0.05	0.04	F = 0.66
					R^2 = 0.02
		Constant	1.90		MS_e = 0.29
		Maricopa			
	158	Head Start	0.06	0.05	F = 2.14
					R^2 = 0.08
		Constant	1.65		MS_e = 0.31
		Mingo			
	214	Head Start	-.025	0.04	F = 0.68
					R^2 = 0.02
		Constant	1.40		MS_e = 0.32

[a] Adjusted for age, gender, race, per capita income percentile, family employment status and mother's education.

[b] Centered without weights.

[c] Significance
  $^{*}p < .05$
  $^{**}p < .01$
  $^{***}p < .001$

Table 8-11

Percentage of Posttest Children Who Scored at Various Percentile Levels on the McCarthy Motor Scale[a]

Percentile Score	Posttested Children (Samples A, B, C) In:									
	Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
	HS n=127	NHS n=101	HS n=108	NHS n=86	HS n=106	NHS n=61	HS n=119	NHS n=109	HS n=460	NHS n=357
< 10	10.2	28.7	7.4	12.8	34.0	23.0	22.7	22.0	18.3	21.8
< 20	18.1	46.5	17.6	24.4	48.1	42.6	42.9	40.4	31.3	38.7
< 30	31.5	60.4	28.7	30.2	61.3	50.8	54.6	49.5	43.7	48.2
< 40	38.6	70.3	35.2	36.0	67.0	67.2	64.7	59.6	51.1	58.3
< 50	55.1	75.2	47.2	44.2	77.4	70.5	76.5	70.6	63.9	65.5
< 60	64.6	87.1	60.2	59.3	87.7	82.0	87.4	81.7	74.8	77.9
< 70	72.4	92.1	68.5	64.0	94.3	88.5	88.2	86.2	80.7	82.9
70+	27.6	7.9	31.5	36.0	5.7	11.5	11.8	13.8	19.3	17.1

[a] Children who refused to cooperate with the examiner eliminated from results.

Table 8-12

Average McCarthy Developmental Percentile Scores by Age Group

Age Group		Posttested Children (Samples A, B, C) In:			
		Greene & Humphreys Counties n=228	St. Clair County n=194	Maricopa County n=167	Mingo County n=228
2.25-2.74	n				7
	Mean				45.00
	S.D.				31.62
2.75-3.74	n	6	8		16
	Mean	35.67	65.38		50.94
	S.D.	34.29	30.16		24.17
3.25-3.74	n	54	40		44
	Mean	42.48	61.75		35.27
	S.D.	29.33	26.49		29.03
3.75-4.24	n	57	52		48
	Mean	32.05	42.38		33.15
	S.D.	26.09	30.16		25.50
4.25-4.74	n	59	47	31	51
	Mean	38.54	52.17	27.55	21.49
	S.D.	24.62	27.78	22.09	20.31
4.75-5.24	n	23	37	90	44
	Mean	35.26	38.54	25.13	27.48
	S.D.	27.87	30.43	24.22	23.55
5.25-5.74	n	12	5	45	19
	Mean	43.17	62.00	34.29	33.05
	S.D.	28.96	25.15	28.18	27.19
5.75-6.24	n	13	5	1	
	Mean	41.08	39.20	1.00	
	S.D.	35.41	35.51	0.00	
≥ 6.25	n	4			
	Mean	29.25			
	S.D.	33.19			

Table 8-13

Average Number of Refusals for the Development Evaluation by Age Group

Age Group		Posttested Children (Samples A, B, C) In:			
		Greene & Humphreys Counties n=228	St. Clair County n=194	Maricopa County n=167	Mingo County n=228
< 2.25	n				
	Mean				
	S.D.				
2.25-2.74	n				6
	Mean				4.5
	S.D.				6.0
2.75-3.24	n	6	8		16
	Mean	8.8	6.8		2.0
	S.D.	14.9	5.8		3.0
3.25-3.74	n	54	40		44
	Mean	4.8	3.4		1.8
	S.D.	9.7	3.4		3.6
3.75-4.24	n	57	52		48
	Mean	4.2	5.1		3.1
	S.D.	9.4	7.6		2.6
4.25-4.74	n	59	47	31	51
	Mean	.88	2.2	.13	1.2
	S.D.	1.5	2.2	.72	3.4
4.75-5.24	n	23	37	90	44
	Mean	2.8	1.9	.59	.65
	S.D.	8.2	2.0	1.3	2.1
5.25-5.74	n	12	5	45	19
	Mean	.69	1.7	.47	.05
	S.D.	1.9	1.6	1.0	.22
5.75-6.24	n	13	5	1	
	Mean	.69	2.0	0.0	
	S.D.	.86	2.4	0.0	
6.25-6.75	n	4			
	Mean	.75			
	S.D.	.96			

Table 8-14

DEVELOPMENTAL ASSESSMENT FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
McCARTHY PERCENTILE												
Sample A	74	35.19	23.41	42	52.92	32.06	56	31.14	26.88	36	24.89	21.84
Sample B	56	37.50	30.43	41	41.39	28.64	11	31.64	25.45	31	30.77	24.86
Sample C	88	30.50	29.02	111	51.18	28.02	100	25.68	24.11	161	32.99	26.80
		F= 0.53	P= 0.588		F= 1.90	P= 0.152		F= 0.98	P= 0.379		F= 1.46	P= 0.235
McCARTHY REFUSALS												
Sample A	74	1.95	5.84	42	2.52	2.46	56	0.38	1.23	36	1.56	3.84
Sample B	56	2.73	7.56	41	4.61	5.83	11	0.00	0.00	31	1.65	3.41
Sample C	88	4.04	8.07	111	3.22	4.98	100	0.57	1.17	161	1.12	2.74
		F= 1.58	P= 0.208		F= 2.11	P= 0.124		F= 1.47	P= 0.233		F= 0.58	P= 0.558
AGGRESSIVE CHILD INDEX												
Sample A	68	2.01	0.56	40	2.03	0.61	55	2.48	0.65	35	2.38	0.78
Sample B	50	2.02	0.67	40	2.38	0.77	11	2.22	0.64	31	2.46	0.59
Sample C	83	1.95	0.62	106	2.23	0.87	97	2.56	0.74	156	2.54	0.68
		F= 0.33	P= 0.719		F= 2.69	P= 0.070		F= 1.24	P= 0.293		F= 0.83	P= 0.439
WITHDRAWN CHILD INDEX												
Sample A	63	1.36	0.37	40	1.56	0.53	54	2.08	0.58	36	1.60	0 56
Sample B	52	1.42	0.53	37	1.63	0.53	10	1.93	0.48	30	1.61	0.43
Sample C	94	1.40	0.43	106	1.54	0.53	98	2.01	0.60	150	1.75	0.58
		F= 0.30	P= 0.744		F= 0.36	P= 0.698		F= 0.43	P= 0.649		F= 1.44	P= 0.240

Table 8-14 (continued)

AGGRESSIVE CHILD INDEX FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	40	1.63	2.00	2.50	2.03	0.62	28	1.63	1.75	2.25	1.98	0.53	0.32	0.752
Sample B	30	1.50	2.00	2.50	2.18	0.74	20	1.44	1.69	2.25	1.82	0.52	1.84	0.073
Sample C	47	1.63	1.88	2.31	2.00	0.57	46	1.38	1.75	2.25	1.89	0.67	0.88	0.380
Sample D	9	1.75	1.88	2.00	1.88	0.50	12	1.50	1.81	2.75	2.07	0.78	-0.70	0.490
Sample E	12	1.38	2.06	2.25	1.98	0.78	16	1.69	1.88	2.38	2.06	0.46	-0.33	0.746
St.Clair														
Sample A	34	1.63	2.06	2.50	2.02	0.58	16	1.44	2.00	2.50	2.03	0.72	-0.05	0.961
Sample B	12	1.75	1.75	2.13	1.90	0.44	28	2.06	2.50	3.31	2.58	0.79	-3.48	0.001
Sample C	68	1.75	2.25	2.63	2.19	0.64	37	1.75	2.25	2.63	2.28	0.73	-0.63	0.529
Sample D	36	1.94	2.38	3.13	2.50	0.77	34	2.00	2.38	2.75	2.38	0.74	0.67	0.502
Sample E	62	1.88	2.25	2.88	2.41	0.79	60	1.75	2.25	2.75	2.28	0.65	1.03	0.306
Maricopa														
Sample A	39	2.25	2.63	2.88	2.51	0.52	16	1.69	2.31	3.19	2.40	0.90	0.48	0.638
Sample B	10	2.00	2.19	2.88	2.36	0.66	1	----	1.75	----	1.75	----	2.47	0.036
Sample C	55	1.88	2.50	3.13	2.57	0.81	42	2.00	2.56	2.88	2.55	0.65	0.12	0.902
Sample D	21	2.13	2.63	3.13	2.67	0.85	17	1.88	2.50	2.88	2.40	0.65	1.08	0.287
Sample E	8	1.81	2.63	2.75	2.31	0.67	14	1.88	2.06	2.63	2.22	0.63	0.31	0.764
Mingo														
Sample A	18	2.00	2.25	3.00	2.58	0.85	17	1.63	2.13	2.75	2.15	0.67	1.67	0.105
Sample B	17	2.00	2.38	3.00	2.50	0.58	14	2.00	2.19	2.88	2.41	0.60	0.42	0.681
Sample C	80	1.94	2.50	2.88	2.46	0.63	76	2.19	2.75	3.00	2.62	0.72	-1.45	0.149
Sample D	22	2.00	2.38	3.00	2.54	0.92	14	2.38	2.63	3.13	2.85	0.63	-1.19	0.242
Sample E	33	2.25	2.50	3.13	2.60	0.71	31	2.38	2.63	3.00	2.63	0.56	-0.17	0.868

Table 8-14 (continued)

SELECTED FAMILY BACKGROUND CHARACTERISTICS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD
AGGRESSIVE CHILD INDEX												
Sample A	68	2.01	0.58	40	2.02	0.61	55	2.48	0.65	35	2.38	0.78
Sample B	50	2.01	0.67	40	2.38	0.77	11	2.22	0.64	31	2.46	0.58
Sample C	93	1.94	0.62	106	2.23	0.67	97	2.56	0.74	156	2.53	0.68
Sample D	21	1.89	0.67	70	2.44	0.75	38	2.55	0.77	36	2.66	0.83
Sample E	28	2.03	0.61	122	2.35	0.72	22	2.26	0.63	64	2.61	0.63
	F= 0.20	P= 0.940		F= 2.75	P= 0.028		F= 1.30	P= 0.270		F= 1.05	P= 0.383	
WITHDRAWN CHILD INDEX												
Sample A	63	1.36	0.37	40	1.56	0.53	54	2.08	0.58	36	1.60	0.56
Sample B	52	1.42	0.53	37	1.62	0.53	10	1.93	0.48	30	1.61	0.43
Sample C	94	1.40	0.43	106	1.54	0.53	98	2.01	0.59	159	1.75	0.58
Sample D	20	1.47	0.49	69	1.72	0.68	36	1.86	0.66	37	1.50	0.43
Sample E	29	1.48	0.54	121	1.76	0.70	22	2.12	0.77	65	1.42	0.43
	F= 0.50	P= 0.738		F= 2.32	P= 0.056		F= 0.97	P= 0.427		F= 5.22	P= 0.000	

Table 8-14 (continued)

DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE														
Greene/Humphreys	127	25.00	45.00	70.00	45.86	27.20	101	5.00	20.00	45.00	27.38	24.80	5.36	0.000
St.Clair	108	25.00	50.00	72.50	49.59	29.30	86	20.00	50.00	80.00	49.13	31.00	0.11	0.915
Maricopa	106	5.00	20.00	40.00	25.80	23.70	61	10.00	25.00	55.00	31.56	27.30	-1.38	0.172
Mingo	119	10.00	25.00	45.00	29.77	25.10	109	10.00	30.00	55.00	33.19	26.70	-0.99	0.321
McCARTHY REFUSALS														
Greene/Humphreys	127	0.00	0.00	1.00	1.20	3.97	101	0.00	1.00	3.00	5.36	10.50	-3.79	0.000
St.Clair	108	0.00	1.00	4.00	2.65	4.09	86	1.00	3.00	5.00	4.26	5.44	-2.28	0.024
Maricopa	106	0.00	0.00	0.00	0.45	1.19	61	0.00	0.00	0.00	0.49	1.12	-0.21	0.833
Mingo	119	0.00	0.00	1.00	0.90	2.38	109	0.00	0.00	1.00	1.66	3.55	-1.88	0.062
AGGRESSIVE CHILD INDEX														
Greene/Humphreys	117	1.63	2.00	2.50	2.05	0.63	94	1.50	1.75	2.25	1.90	0.60	1.70	0.091
St.Clair	105	1.75	2.13	2.50	2.12	0.60	81	1.75	2.25	2.75	2.34	0.77	-2.09	0.038
Maricopa	104	2.06	2.50	3.00	2.52	0.70	59	1.94	2.38	2.88	2.50	0.72	0.19	0.847
Mingo	115	2.00	2.50	2.88	2.49	0.66	107	2.00	2.63	2.88	2.52	0.71	-0.35	0.730
WITHDRAWN CHILD INDEX														
Greene/Humphreys	113	1.00	1.29	1.57	1.41	0.42	96	1.00	1.29	1.57	1.38	0.46	0.50	0.619
St.Clair	101	1.00	1.29	1.86	1.51	0.49	82	1.14	1.57	2.00	1.61	0.56	-1.32	0.190
Maricopa	102	1.57	2.00	2.43	2.05	0.58	60	1.57	2.00	2.36	1.98	0.59	0.71	0.478
Mingo	118	1.29	1.57	2.00	1.71	0.55	107	1.29	1.57	2.00	1.70	0.57	0.03	0.974

Table 8-14 (continued)

DEVELOPMENTAL ASSESSMENT FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
McCARTHY PERCENTILE	460	10.00	35.00	60.00	37.95	28.20	357	10.00	30.00	55.00	35.11	28.50	1.42	0.155
McCARTHY REFUSALS	460	0.00	0.00	1.00	1.29	3.26	357	0.00	[illegible].00	3.00	3.13	6.74	-4.75	0.000
AGGRESSIVE CHILD INDEX	441	1.75	2.25	2.75	2.29	0.68	341	1.75	2.25	2.88	2.30	0.74	-0.22	0.825
WITHDRAWN CHILD INDEX	434	1.29	1.57	2.00	1.66	0.57	345	1.14	1.57	2.00	1.64	0.58	0.58	0.564

Table 8-14 (continued)

WITHDRAWN CHILD INDEX FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SAMPLE BY SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
Greene/Humphreys														
Sample A	35	1.00	1.29	1.64	1.39	0.38	28	1.00	1.29	1.29	1.32	0.37	0.80	0.429
Sample B	31	1.00	1.29	1.64	1.41	0.43	21	1.00	1.29	1.43	1.44	0.66	-0.16	0.878
Sample C	47	1.00	1.29	1.57	1.41	0.45	47	1.00	1.29	1.57	1.38	0.41	0.34	0.735
Sample D	8	1.00	1.21	1.71	1.34	0.38	12	1.21	1.36	1.71	1.56	0.56	-1.05	0.307
Sample E	12	1.00	1.36	1.43	1.31	0.30	17	1.00	1.29	2.29	1.61	0.63	-1.67	0.108
St.Clair														
Sample A	23	1.00	1.29	1.78	1.47	0.51	17	1.29	1.57	2.14	1.68	0.54	-1.28	0.209
Sample B	12	1.14	1.50	1.71	1.52	0.48	25	1.14	1.71	2.14	1.67	0.56	-0.82	0.421
Sample C	66	1.14	1.29	1.86	1.52	0.50	40	1.00	1.29	1.86	1.55	0.58	-0.27	0.788
Sample D	35	1.29	1.57	2.14	1.73	0.72	34	1.14	1.50	2.14	1.70	0.63	0.20	0.840
Sample E	61	1.29	1.71	2.43	1.83	0.71	60	1.21	1.57	1.93	1.69	0.70	1.07	0.287
Maricopa														
Sample A	39	1.71	2.00	2.57	2.16	0.58	15	1.57	2.14	2.29	1.89	0.55	1.60	0.121
Sample B	9	1.57	1.86	2.29	1.89	0.49	1	----	2.29	----	2.29	----	-2.41	0.042
Sample C	54	1.57	2.00	2.43	2.00	0.58	44	1.57	1.86	2.43	2.01	0.61	-0.06	0.952
Sample D	21	1.29	1.71	2.29	1.85	0.73	15	1.29	2.00	2.21	1.87	0.58	-0.07	0.941
Sample E	9	1.29	2.14	2.43	2.08	0.80	13	1.57	1.86	2.43	2.15	0.77	-0.22	0.830
Mingo														
Sample A	18	1.29	1.57	1.86	1.66	0.53	18	1.00	1.43	1.71	1.55	0.60	0.59	0.560
Sample B	17	1.43	1.57	2.14	1.71	0.42	13	1.29	1.29	2.00	1.48	0.42	1.43	0.164
Sample C	83	1.29	1.57	2.00	1.72	0.59	76	1.29	1.71	2.14	1.78	0.58	-0.67	0.503
Sample D	22	1.00	1.43	2.00	1.55	0.46	15	1.07	1.29	1.71	1.43	0.39	0.84	0.409
Sample E	33	1.00	1.29	1.57	1.41	0.49	32	1.14	1.43	1.64	1.42	0.35	-0.12	0.904

CHAPTER NINE

APPENDIX TABLES

Table 9-1

Correlations of Speech and Language Scores by Age at Posttest

Speech and Language Comprehension Measures	Posttested Children (Samples A, B, and C) in:					
	Greene or Humphreys Counties	St. Clair County	Maricopa County	Mingo County	All Sites	All Non-Bilingual
Speech						
Denver Articulation Screening Exam (DASE)						
# correct	.27***	.11	.12	.31***	.29***	.25***
# refusals	-.16*	-.02	( )[a]	-.13*	-.11**	-.10**
Language Comprehension						
Assessment of Children's Language Comprehension (ACLC)						
# correct	.45***	.42***	.06	.40***	.44***	.40***
# refusals	-.07	-.13*	( )[a]	-.06	-.10**	-.08*
2-Critical Elements						
# correct	.39***	.36***	.04	.37***	.43***	.37***
# refusals	-.09	-.10	.07	.07	-.03	-.04
3-Critical Elements						
# correct	.46***	.47***	.11	.38***	.48***	.44***
# refusals	-.06	-.12*	.10	.06	-.02	-.04
4-Critical Elements	.43***	.41***	.24**	.35***	.45***	.39***
# correct	-.08	-.13*	.10	.08	-.02	-.05
# refusals						
Fluharty Preschool Speech and Language Test (Repitition Subtest)						
# correct	.32***	.29***	.16*	.39***	.33***	.34***
# refusals	-.14*	-.07	-.01	-.12*	-.14***	-.12**

[a] Cannot be computed.

Table 9-2

Speech and Language Measures For Combined Groups of Head Start and Non-Head Start Children With Unadjusted Comparisons Between Males and Females Within Site at Pretest

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY														
Greene/Humphreys	112	34.00	41.00	45.00	39.76	7.22	116	38.00	43.00	46.00	41.72	6.44	-2.17	0.031
St.Clair	101	36.00	41.00	45.00	39.49	7.52	88	36.00	41.00	45.50	39.33	5.69	0.13	0.897
Maricopa	62	43.00	47.00	48.00	45.52	4.33	67	45.00	46.00	48.00	45.63	3.83	-0.12	0.908
Mingo	114	42.00	45.00	47.00	43.96	4.76	106	41.00	45.00	47.00	43.25	5.75	0.99	0.321
2 CRITICAL ELEMENTS														
Greene/Humphreys	111	6.00	8.00	9.00	7.13	2.24	116	7.00	8.00	9.00	7.79	1.86	-2.44	0.016
St.Clair	102	6.00	8.00	9.00	7.25	2.20	88	6.00	8.00	9.00	7.51	2.22	-0.83	0.409
Maricopa	60	9.00	9.00	10.00	9.07	1.09	68	9.00	9.00	10.00	9.20	0.99	-0.72	0.476
Mingo	114	7.00	8.00	9.00	7.89	1.69	106	7.00	8.00	9.00	7.75	2.05	0.59	0.557
3 CRITICAL ELEMENTS														
Greene/Humphreys	111	4.00	6.00	7.00	5.41	2.41	115	5.00	6.00	8.00	6.10	2.30	-2.17	0.031
St.Clair	102	4.00	5.50	7.00	5.39	2.15	88	5.00	6.00	8.00	5.93	2.36	-1.64	0.103
Maricopa	60	6.00	8.00	9.00	7.63	1.78	68	7.00	8.06	9.00	7.95	1.59	-1.06	0.291
Mingo	114	5.00	6.00	8.00	6.17	2.27	105	5.00	7.00	8.00	6.19	2.27	-0.08	0.938
4 CRITICAL ELEMENTS														
Greene/Humphreys	111	2.00	4.00	5.00	3.89	2.34	115	4.00	5.00	6.30	4.74	2.07	-2.91	0.004
St.Clair	102	3.00	4.00	6.00	4.27	2.05	88	3.00	5.00	6.00	4.36	2.20	-0.28	0.779
Maricopa	60	5.00	6.50	8.00	6.47	2.16	68	5.00	7.00	8.06	6.69	1.72	-0.67	0.502
Mingo	114	3.00	5.00	7.00	4.87	2.33	104	3.00	5.00	6.00	4.84	2.29	0.10	0.919

Table 9-2 (continued)

Speech and Language Measures For Combined Groups of Head Start and Non-Head Start Children With Unadjusted Comparisons Between Males and Females Within Site at Pretest

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
ARTICULATION														
Greene/Humphreys	101	20.00	24.00	28.00	22.57	7.12	99	25.00	28.00	29.00	26.30	4.97	-4.50	0.000
St.Clair	86	21.00	25.00	27.00	23.94	4.97	86	23.00	27.00	29.00	25.27	4.87	-1.87	0.063
Maricopa	54	23.00	27.00	28.00	25.96	3.41	55	27.00	28.00	29.50	27.51	3.02	-2.47	0.015
Minne	101	18.00	23.00	27.00	21.99	6.35	99	21.00	25.00	27.00	23.47	5.47	-1.75	0.082
SENTENCE REPETITION														
Greene/Humphreys	101	6.00	8.00	10.00	7.11	3.20	109	7.00	9.00	10.00	8.18	2.56	-2.62	0.009
St.Clair	87	5.00	7.00	9.00	6.64	2.77	91	7.00	9.00	10.00	7.70	2.63	-2.75	0.007
Maricopa	53	7.00	8.00	9.00	7.74	2.31	56	7.00	9.00	10.00	8.37	1.80	-1.58	0.117
Minne	107	6.00	7.00	9.00	6.57	3.15	94	7.00	9.00	10.00	7.83	2.56	-3.12	0.002
NUMBER OF ERRORS														
Greene/Humphreys	98	0.00	1.00	3.00	1.81	1.89	109	0.00	0.00	2.00	1.11	1.51	2.90	0.004
St.Clair	93	0.00	1.00	3.00	2.06	2.07	83	0.00	1.00	2.00	1.30	1.81	2.61	0.010
Maricopa	51	0.00	0.00	1.00	0.82	1.41	61	0.00	0.00	1.00	0.62	1.27	0.78	0.436
Minne	84	0.00	2.00	3.00	1.90	1.96	85	0.00	1.00	2.00	1.28	1.49	2.34	0.021

Table 9-2 (continued)

Speech and Language Measures For Combined Groups of Head Start and Non-Head Start Children With Unadjusted Comparisons Between Males and Females Within Site at Pretest

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY	389	38.00	43.89	47.00	41.84	6.72	377	40.00	44.09	47.00	42.20	7.00	-0.89	0.375
2 CRITICAL ELEMENTS	387	7.00	8.00	9.00	7.68	2.04	379	7.00	8.00	9.00	7.96	1.97	-1.88	0.061
3 CRITICAL ELEMENTS	387	5.00	6.09	8.00	5.97	2.34	379	5.00	7.00	8.00	6.41	2.31	-2.57	0.010
4 CRITICAL ELEMENTS	387	3.00	5.09	6.00	4.68	2.38	379	3.00	5.00	7.00	4.98	2.27	-1.82	0.069
ARTICULATION	362	20.00	25.09	28.00	23.28	5.91	397	24.00	27.00	29.00	25.45	4.82	-5.20	0.000
SENTENCE REPITITION	368	5.00	8.09	9.00	6.92	2.98	390	7.00	9.33	10.00	8.22	2.47	-5.21	0.000
NUMBER OF PROBLEMS	326	0.00	1.09	3.00	1.75	1.95	337	0.00	0.90	2.00	1.11	1.56	4.69	0.000

Table 9-2 (continued)

SPEECH AND LANGUAGE MEASURES FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN MALES AND FEMALES ACROSS SITE (EXCLUDING MARICOPA COUNTY)

	MALES						FEMALES							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY	327	38.00	43.00	46.00	41.14	6.87	319	38.00	43.00	46.00	41.57	7.45	-0.75	0.456
2 CRITICAL ELEMENTS	327	7.00	8.00	9.00	7.45	2.07	319	7.00	8.00	9.00	7.70	2.03	-1.63	0.103
3 CRITICAL ELEMENTS	327	4.00	6.09	7.00	5.67	2.31	309	5.00	6.70	8.00	6.28	2.30	-2.25	0.025
4 CRITICAL ELEMENTS	327	3.00	4.09	6.00	4.35	2.28	307	3.00	5.00	6.00	4.66	2.19	-1.76	0.078
ARTICULATION	288	20.00	24.00	27.00	22.78	6.15	279	23.00	26.00	29.00	25.03	5.01	-4.77	0.000
SENTENCE REPITITION	295	5.00	8.09	9.00	6.78	3.06	278	7.00	9.00	10.00	7.95	2.58	-4.95	0.000
NUMBER OF PROBLEMS	275	0.00	1.00	3.00	1.92	1.96	276	0.00	1.00	2.00	1.22	1.59	4.61	0.000

Table 9-3

Results for Varimax Rotated Factor Analysis of Speech and Language Comprehension Problems

	Factor 1	Factor 2
Denver Articulation Screening Examination (DASE)	.98	.16
Assessment of Children's Language Comprehension	.16	.75
2-Critical Elements	.16	.75
3-Critical Elements	.19	.79
4-Critical Elements	.15	.69
Fluharty Screening Test for Preschool Children (Sentence Repetition)	.41	.38
Speech Quality	.68	-.19

Table 9-4

Minimum Scores Used in Determining Speech Deficiencies

Measure	Child Age								
	Under 2 1/2	2 1/2 - 3	3 - 3 1/2	3 1/2 - 4	4 - 4 1/2	4 1/2 - 5	5 - 5 1/2	5 1/2 - 6	6 - 6 1/2
ACLC									
1 Critical Element	28	28	32	34	39	40	42	44	44
2 Critical Elements	3	4	5	6	7	7	8	8	8
3 Critical Elements	2	2	3	4	5	6	6	6	7
DASE	14	14	15	16	18	22	22	24	25
Fluharty	3	3	4	4	6	6	7	7	8

Table 9-5

Proportion of Head Start-Eligible Children Identified to be in Need of Diagnostic Services by Different Age Cutoffs

	Pretested Children (Samples A and D) in: Greene & Humphreys Counties		
	At Pretest	Six-Month Lag	One-Year Lag
Any Deficiency %	69.4	60.0	32.9
Speech			
DASE %	25.9	33.3	23.3
PDQ %	35.7	19.2	12.3
Any %	45.9	32.9	28.2
Language Comprehension			
ACLC %	48.2	38.8	30.6
Fluharty %	31.8	28.2	28.2
Any %	60.0	48.2	42.4

	Pretested Children (Samples A and D) in: St. Clair County		
	At Pretest	Six-Month Lag	One-Year Lag
Any Deficiency %	51.1	34.8	27.2
Speech			
DASE %	14.1	13.0	12.0
PDQ %	26.7	17.8	14.4
Any %	30.4	22.8	19.6
Language Comprehension			
ACLC %	31.0	16.1	8.0
Fluharty %	13.0	12.0	7.6
Any %	38.0	22.8	13.0

	Pretested Children (Samples A and D) in: Mingo County		
	At Pretest	Six-Month Lag	One-Year Lag
Any Deficiency %	73.6	69.8	67.9
Speech			
DASE %	23.1	19.2	19.2
PDQ %	45.7	41.3	41.3
Any %	49.1	45.3	45.3
Language Comprehension			
ACLC %	25.0	8.2	4.1
Fluharty %	53.8	48.1	42.3
Any %	56.7	49.1	43.4

Table 9-6

Comparison of Head Start Health Evaluation Findings and those Based on Head Start Screens Recorded in Health Records

Head Start Records		Postscreened Children (Samples A, B, C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings
Speech or Language Problems	N	12	38	8	62	14	3	1	2	35	105
Agree	n	7	24	6	34	10	1	1	1	23	60
	%	58.3	63.2	75.0	54.8	71.4	33.3	100.0	50.0	67.6	58.3
Disagree	n	5	14	2	28	4		0	1	11	43
	%	41.7	36.8	25.0	45.2	28.6	66.7	0.0	50.0	32.4	41.7
		p < 0.188		p < 0.112		FET[a] = 0.357		FET = 0.667		p < 0.009	
Speech Problems	N	12	38	8	62	14	3	0 0.0	2	35	105
Agree	n	6	28	5	45	6	1		1	17	75
	%	50.0	73.7	62.5	72.6	42.9	33.3		50.0	48.6	71.4
Disagree	n	6	10	3	17	8	2	1	1	18	30
	%	50.0	26.3	37.5	27.4	57.1	66.7	100.0	50.0	51.4	28.6
		p < 0.140		p < 0.444		FET = 0.643				p < 0.005	
Language Comprehension Problems	N	12	38	8	62	14	3	1	2	35	105
Agree	n	5	30	5	46	7	1	1	1	18	78
	%	41.7	78.9	62.5	74.2	50.0	33.3	33.3	50.0	51.4	74.3
Disagree	n	7	8	3	16	7	2	0	1	17	27
	%	58.3	21.1	37.5	25.8	50.0	66.7	0.0	50.0	48.6	25.7
		p < 0.156		p < 0.033		FET = 0.500		FET = 0.667		p < 0.002	

[a] FET is Fisher's Exact Test

Table 9-7

Speech and Language Deviations from Grand Mean for Combinations of Head Start and Previous Head Start Experience in All Sites

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	33.86	-1.34	.87	.05	1.09
Posttest-longitudinal	42.95	-.37	-.45	.38	.24
Posttest-cross-sectional	42.54	-.08	.11	.43	-.42
Two Critical Elements					
Pretest-longitudinal	6.27	-.12	-.18	.03	.30
Posttest-longitudinal	8.13	-.05	-.01	-.16	.29
Posttest-cross-sectional	7.97	.04	-.08	.06	-.06
Three Critical Elements					
Pretest-longitudinal	4.03	.03	-.48	-.17	.58
Posttest-longitudinal	6.53	.18	-.64	.08	.05
Posttest-cross-sectional	6.30	.07	-.27	.19	-.12
Four Critical Elements					
Pretest-longitudinal	2.48	.04	.28	-.30	.12
Posttest-longitudinal	5.09	.20	.09	-.12	-.14
Posttest-cross-sectional	4.94	-.14	.42	.05	-.14
Repetition					
Pretest-longitudinal	5.59	-.46	-.45	.31	.57
Posttest-longitudinal	7.88	-.20	-.68	.42	.09
Posttest-cross-sectional	7.67	-.05	-.17	.17	-.04
Number of Speech Problems					
Pretest-longitudinal	2.25	.11	.44	-.03	-.46
Posttest-longitudinal	1.41	.19	-.11	-.17	.05
Posttest-cross-sectional	1.41	.02	-.05	-.08	.10

Table 9-7 (continued)

Speech and Language Deviations from Grand Mean for Combinations of Head Start and Previous Head Start Experience in All Non-Bilingual Sites

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	33.86	-1.34	.07	.05	1.09
Posttest-longitudinal	41.88	-.60	-.03	.32	.39
Posttest-cross-sectional	41.90	.05	.11	.70	-.76
Two Critical Elements					
Pretest-longitudinal	6.27	-.12	-.18	.03	.30
Posttest-longitudinal	7.82	-.11	.02	-.16	.34
Posttest-cross-sectional	7.72	.10	-.07	.10	-.17
Three Critical Elements					
Pretest-longitudinal	4.03	.03	-.48	.17	.58
Posttest-longitudinal	6.17	0.28	-.61	.67	-.02
Posttest-cross-sectional	5.99	.17	-.31	.27	-.26
Four Critical Elements					
Pretest-longitudinal	2.48	.04	.28	-.30	.12
Posttest-longitudinal	4.69	.31	.02	-.16	-.20
Posttest-cross-sectional	4.672	-.02	.38	.03	-.23
Articulation					
Pretest-longitudinal	19.45	-.75	-1.64	1.40	-.09
Posttest-longitudinal	24.92	-.31	.31	.29	-.21
Posttest-cross-sectional	24.35	-.09	-.07	.24	-.09
Repetition	5.59	-.46	-.45	.31	.57
Pretest-longitudinal	8.08	-.34	-.49	.44	.15
Posttest-longitudinal	7.60	-.07	-.18	.23	-.03
Posttest-cross-sectional					
Number of Speech Problems					
Pretest-longitudinal	2.25	.11	.44	-.03	-.46
Posttest-longitudinal	1.58	.10	.06	-.29	.21
Posttest-cross-sectional	1.55	-.02	-.06	-.16	.24

Table 9-7 (continued)

Speech and Language Deviations from Grand Mean for Combinations of Head Start and Previous Head Start Experience in Greene & Humphreys Counties

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	30.65	.52	1.62	-1.16	-1.01
Posttest-longitudinal	41.74	.11	-.99	1.78	-1.77
Posttest-cross-sectional	41.32	.36	-.44	.94	-1.19
Two Critical Elements					
Pretest-longitudinal	5.95	.48	-.43	.04	-.47
Posttest-longitudinal	7.80	-0.00	-0.05	.01	.06
Posttest-cross-sectional	7.67	.08	-.13	.12	-.14
Three Critical Elements					
Pretest-longitudinal	3.43	.22	.14	-.52	.26
Posttest-longitudinal	6.05	.40	-.27	.09	-.54
Posttest-cross-sectional	5.89	.47	-.44	.07	-.34
Four Critical Elements					
Pretest-longitudinal	1.97	.36	.82	-.63	-.62
Posttest-longitudinal	4.74	.56	-.39	-.12	-.37
Posttest-cross-sectional	4.42	.21	.15	-.06	-.40
Articulation					
Pretest-longitudinal	18.67	-.67	-.92	1.06	.61
Posttest-longitudinal	25.81	-.80	.53	.19	.60
Posttest-cross-sectional	25.11	-.60	1.26	.40	-.73
Repetition					
Pretest-longitudinal	5.75	-.52	.05	.22	.55
Posttest-longitudinal	8.20	.04	.04	.47	-.86
Posttest-cross-sectional	7.99	.05	.33	.13	-.51
Number of Speech Problems					
Pretest-longitudinal	2.61	-.13	.15	.20	-.28
Posttest-longitudinal	1.33	.12	-.30	-.07	.25
Posttest-cross-sectional	1.43	-.03	-.28	-.01	.35

Table 9-7 (continued)

Speech and Language Deviations from Grand Mean for
Combinations of Head Start and Previous Head Start Experience
in St. Claire County

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	35.43[a]				
Posttest-longitudinal	40.03[a]				
Posttest-cross-sectional	40.11	-.27	2.60	.90	-1.30
Two Critical Elements					
Pretest-longitudinal	6.19[a]				
Posttest-longitudinal	7.52[a]				
Posttest-cross-sectional	7.54	.31	.17	0.00	-.24
Three Critical Elements					
Pretest-longitudinal	4.15[a]				
Posttest-longitudinal	5.77[a]				
Posttest-cross-sectional	5.78	.03	.18	.39	-.47
Four Critical Elements					
Pretest-longitudinal	3.09[a]				
Posttest-longitudinal	4.09[a]				
Posttest-cross-sectional	4.45	-.07	1.17	.17	-.47
Articulation					
Pretest-longitudinal	21.76[a]				
Posttest-longitudinal	24.74[a]				
Posttest-cross-sectional	24.91	.10	.06	-.45	.06
Repetition					
Pretest-longitudinal	6.72[a]				
Posttest-longitudinal	8.07[a]				
Posttest-cross-sectional	7.37	-.48	-.06	.20	.23
Number of Speech Problems					
Pretest-longitudinal	1.81[a]				
Posttest-longitudinal	1.90[a]				
Posttest-cross-sectional	1.70	.20	-.39	-.28	.22

[a] Singular matrix

Table 9-7 (continued)

Speech and Language Deviations from Grand Mean for Combinations of Head Start and Previous Head Start Experience in Maricopa County

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	a				
Posttest-longitudinal	46.42	-.12	-4.18	1.38	-.46
Posttest-cross-sectional	45.57	-.35	.14	.01	.22
Two Critical Elements					
Pretest-longitudinal	a				
Posttest-longitudinal	9.11	.20	-.29	-.20	.14
Posttest-cross-sectional	9.14	-.12	.07	-.04	.14
Three Critical Elements					
Pretest-longitudinal	a				
Posttest-longitudinal	7.69	-.36	-1.19	.31	.39
Posttest-cross-sectional	7.81	-.30	.14	-.05	0.27
Four Critical Elements					
Pretest-longitudinal	a				
Posttest-longitudinal	6.36	-.39	.22	.29	-.01
Posttest-cross-sectional	6.48	-.58	.72	.17	-.05
Articulation					
Pretest-longitudinal	a				
Posttest-longitudinal	27.00	-.33	-.35	.56	-.26
Posttest-cross-sectional	26.71	-0.07	1.49	-.01	-.43
Repetition					
Pretest-longitudinal	a				
Posttest-longitudinal	7.56	-.16	-2.04	.51	.11
Posttest-cross-sectional	8.02	-.02	.05	.09	-.17
Number of Speech Problems					
Pretest-longitudinal	a				
Posttest-longitudinal	.88	.39	-.13	-.06	-.37
Posttest-cross-sectional	9.74	.13	-.31	.09	-.14

Table 9-7 (continued)

Speech and Language Deviations from Grand Mean for Combinations of Head Start and Previous Head Start Experience in Mingo County

Variable	Grand Mean	Head Start Previous Experience	Non-Head Start Previous Experience	Head Start No Previous Experience	Non-Head Start No Previous Experience
Vocabulary: One Critical Element					
Pretest-longitudinal	39.96[a]				
Posttest-longitudinal	44.63[a]				
Posttest-cross-sectional	43.97	-.78	-.40	.38	.71
Two Critical Elements					
Pretest-longitudinal	7.12[a]				
Posttest-longitudinal	8.25[a]				
Posttest-cross-sectional	7.93	-.08	-.12	.26	-.05
Three Critical Elements					
Pretest-longitudinal	5.19[a]				
Posttest-longitudinal	7.00[a]				
Posttest-cross-sectional	6.26	-.19	-.49	.32	.30
Four Critical Elements					
Pretest-longitudinal	3.31[a]				
Posttest-longitudinal	5.08[a]				
Posttest-cross-sectional	4.97	-.35	.37	.06	.13
Articulation					
Pretest-longitudinal	1.57[a]				
Posttest-longitudinal	2.04[a]				
Posttest-cross-sectional	23.09	.64	-2.09	.05	-.27
Repetition					
Pretest-longitudinal	3.74[a]				
Posttest-longitudinal	7.79[a]				
Posttest-cross-sectional	7.40	.07	-.01	.31	.11
Number of Speech Problems					
Pretest-longitudinal	1.91[a]				
Posttest-longitudinal	1.82[a]				
Posttest-cross-sectional	1.57	-.16	.75	-.27	.05

Table 9-8

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE SPEECH SCREENS
FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	N
PER CAPITA INCOME LESS THAN $1200	N	49	69	57	44	17	80	2	6
	n	40	48	50	34	12	46	0	5
	%	81.6	69.6	87.7	77.3	70.6	57.5	0.0	62.
		CHI SQ = 2.201 DF = 1 P = 0.138		CHI SQ = 1.936 DF = 1 P = 0.164		CHI SQ = 0.999 DF = 1 P = 0.317		CHI SQ = 3.129 DF = 1 P = 0.077	
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	50	74	61	47	17	84	3	4
	n	26	33	22	20	9	45	2	2
	%	52.0	44.6	36.1	42.6	52.9	53.6	66.7	53.
		CHI SQ = 0.656 DF = 1 P = 0.418		CHI SQ = 0.470 DF = 1 P = 0.493		CHI SQ = 0.002 DF = 1 P = 0.962		CHI SQ = 0.211 DF = 1 P = 0.646	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	49	74	60	45	17	83	3	4
	n	7	13	13	10	2	14	0	1
	%	14.3	17.6	21.7	22.2	11.8	16.9	0.0	14.
		CHI SQ = 0.189 DF = 1 P = 0.664		CHI SQ = 0.005 DF = 1 P = 0.946		CHI SQ = 0.273 DF = 1 P = 0.601		CHI SQ = 0.495 DF = 1 P = 0.482	
MOTHER THINKS CHILD HAS SPEECH PROBLEM	N	50	74	61	47	15	81	3	4
	n	15	10	11	6	6	4	2	7
	%	30.0	13.5	18.0	12.8	40.0	4.9	66.7	14.6
		CHI SQ = 5.039 DF = 1 P = 0.025		CHI SQ = 0.555 DF = 1 P = 0.456		CHI SQ = 18.873 DF = 1 P = 0.000		CHI SQ = 5.270 DF = 1 P = 0.022	

Table 9-8 (CONTINUED)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO DID AND THOSE WHO DID NOT RECEIVE SPEECH SCREENS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
SCREENED		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	45	65	60	46	16	83	3	47
	n	21	17	8	11	13	59	0	25
	%	46.7	26.2	13.3	23.9	81.3	71.1	0.0	53.2
		CHI SQ = 4.948		CHI SQ = 1.981		CHI SQ = 0.699		CHI SQ = 3.191	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.026		P = 0.159		P = 0.403		P = 0.074	
NO MEDICAID INSURANCE	N	50	73	61	46	17	84	3	48
	n	32	42	15	19	17	84	2	40
	%	64.0	57.5	24.6	41.3	100.0	100.0	66.7	83.3
		CHI SQ = 0.518		CHI SQ = 3.379				CHI SQ = 0.540	
		DF = 1		DF = 1				DF = 1	
		P = 0.472		P = 0.066				P = 0.463	
DIFFICULT ACCESS TO MEDICAL CARE	N	50	74	61	47	16	84	3	48
	n	9	15	3	1	2	18	0	15
	%	18.0	20.3	4.9	2.1	12.5	21.4	0.0	31.3
		CHI SQ = 0.099		CHI SQ = 0.580		CHI SQ = 0.670		CHI SQ = 1.328	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.754		P = 0.446		P = 0.413		P = 0.249	
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	48	71	58	44	17	82	3	44
	n	4	5	1	0	4	10	1	11
	%	8.3	7.0	1.7	0.0	23.5	12.2	33.3	25.0
		CHI SQ = 0.068		CHI SQ = 0.766		CHI SQ = 1.490		CHI SQ = 0.103	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.794		P = 0.381		P = 0.222		P = 0.749	

Table 9-9

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE SPEECH FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

FINDINGS		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	12	26	8	47	14	3	0	2
	n	11	20	8	41	9	3	0	0
	%	91.7	76.9	100.0	87.2	64.3	100.0	0.0	0.0
		CHI SQ = 1.188 DF = 1 P = 0.276		CHI SQ = 1.146 DF = 1 P = 0.284		FISHER'S EXACT TEST DF = 1 P = 0.323			
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	12	27	8	51	14	3	1	2
	n	6	13	3	19	6	3	0	2
	%	50.0	48.1	37.5	37.3	42.9	100.0	0.0	100.0
		CHI SQ = 0.011 DF = 1 P = 0.915		CHI SQ = 0.000 DF = 1 P = 0.989		FISHER'S EXACT TEST DF = 1 P = 0.123		FISHER'S EXACT TEST DF = 1 P = 0.333	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	12	26	8	50	14	3	1	2
	n	4	2	3	10	0	2	0	0
	%	33.3	7.7	37.5	20.0	0.0	66.7	0.0	0.0
		CHI SQ = 4.060 DF = 1 P = 0.044		CHI SQ = 1.215 DF = 1 P = 0.270		FISHER'S EXACT TEST DF = 1 P = 0.022			
MOTHER THINKS CHILD HAS SPEECH PROBLEM	N	12	27	8	51	12	3	1	2
	n	8	4	2	8	6	0	1	1
	%	66.7	14.8	25.0	15.7	50.0	0.0	100.0	50.0
		CHI SQ = 10.486 DF = 1 P = 0.001		CHI SQ = 0.426 DF = 1 P = 0.514		FISHER'S EXACT TEST DF = 1 P = 0.185		FISHER'S EXACT TEST DF = 1 P = 0.667	

Table 9-9 (CONTINUED)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO HAD AND THOSE WHO DID NOT HAVE SPEECH FINDINGS FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
FINDINGS		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	11	26	8	50	13	3	1	2
	n	5	12	1	7	10	3	0	0
	%	45.5	46.2	12.5	14.0	76.9	100.0	0.0	0.0
		CHI SQ = 0.002 DF = 1 P = 0.969		CHI SQ = 0.013 DF = 1 P = 0.909		FISHER'S EXACT TEST DF = 1 P = 0.511			
NO MEDICAID INSURANCE	N	12	27	8	51	14	3	1	2
	n	9	16	1	13	14	3	0	2
	%	75.0	59.3	12.5	25.5	100.0	100.0	0.0	100.0
		CHI SQ = 0.895 DF = 1 P = 0.344		CHI SQ = 0.645 DF = 1 P = 0.422				FISHER'S EXACT TEST DF = 1 P = 0.333	
DIFFICULT ACCESS TO MEDICAL CARE	N	12	27	8	51	14	2	1	2
	n	1	4	0	3	2	0	0	0
	%	8.3	14.8	0.0	5.9	14.3	0.0	0.0	0.0
		CHI SQ = 0.312 DF = 1 P = 0.576		CHI SQ = 0.496 DF = 1 P = 0.481		FISHER'S EXACT TEST DF = 1 P = 0.758			
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	11	27	8	48	14	3	1	2
	n	0	2	0	1	4	0	0	1
	%	0.0	7.4	0.0	2.1	28.6	0.0	0.0	50.0
		CHI SQ = 0.860 DF = 1 P = 0.354		CHI SQ = 0.170 DF = 1 P = 0.680		FISHER'S EXACT TEST DF = 1 P = 0.420		FISHER'S EXACT TEST DF = 1 P = 0.667	

Table 9-10

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

REFERRAL		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		YES	NO	YES	NO	YES	NO	YES	NO
PER CAPITA INCOME LESS THAN $1295	N	10	38	3	54	13	4	0	3
	n	9	29	3	47	8	4	0	1
	%	90.0	76.3	100.0	87.0	61.5	100.0	0.0	33.3
		CHI SQ = 0.899 DF = 1 P = 0.343		CHI SQ = 0.443 DF = 1 P = 0.506		FISHER'S EXACT TEST DF = 1 P = 0.208			
MOTHER HAS LESS THAN 12 YEARS OF EDUCATION	N	10	39	3	58	13	4	1	3
	n	9	21	1	21	5	4	0	2
	%	90.0	53.8	33.3	36.2	38.5	100.0	0.0	66.7
		CHI SQ = 0.047 DF = 1 P = 0.828		CHI SQ = 0.010 DF = 1 P = 0.919		FISHER'S EXACT TEST DF = 1 P = 0.053		FISHER'S EXACT TEST DF = 1 P = 0.500	
MOTHER'S AGE AT BIRTH OF CHILD LESS THAN 18 YEARS	N	10	37	3	57	13	4	1	3
	n	1	7	0	13	0	2	0	1
	%	10.0	18.9	0.0	22.8	0.0	50.0	0.0	33.3
		CHI SQ = 0.443 DF = 1 P = 0.506		CHI SQ = 0.873 DF = 1 P = 0.350		FISHER'S EXACT TEST DF = 1 P = 0.044		FISHER'S EXACT TEST DF = 1 P = 0.750	
MOTHER THINKS CHILD HAS SPEECH PROBLEM	N	10	39	3	58	11	4	1	3
	n	5	9	1	10	6	0	1	1
	%	50.0	23.1	33.3	17.2	54.5	0.0	100.0	33.3
		CHI SQ = 2.827 DF = 1 P = 0.093		CHI SQ = 0.500 DF = 1 P = 0.480		FISHER'S EXACT TEST DF = 1 P = 0.092		FISHER'S EXACT TEST DF = 1 P = 0.500	

Table 9-10 (CONTINUED)

UNADJUSTED COMPARISONS BETWEEN THOSE WHO WERE AND THOSE WHO WERE NOT REFERRED FOR TREATMENT FOR SPECIAL GROUPS OF HEAD START CHILDREN WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
REFERRAL		YES	NO	YES	NO	YES	NO	YES	NO
NO MEDICAL INSURANCE	N	7	37	3	57	12	4	1	2
	n	4	16	0	8	9	4	0	0
	%	57.1	43.2	0.0	14.0	75.0	100.0	0.0	0.0
		CHI SQ = 0.459 DF = 1 P = 0.498		CHI SQ = 0.485 DF = 1 P = 0.486		FISHER'S EXACT TEST DF = 1 P = 0.393			
NO MEDICAID INSURANCE	N	10	38	3	58	13	4	1	2
	n	8	22	0	15	13	4	0	2
	%	80.0	57.9	0.0	25.9	100.0	100.0	0.0	100.0
		CHI SQ = 1.650 DF = 1 P = 0.199		CHI SQ = 1.029 DF = 1 P = 0.310				FISHER'S EXACT TEST DF = 1 P = 0.333	
DIFFICULT ACCESS TO MEDICAL CARE	N	10	39	3	58	13	3	1	3
	n	0	10	0	3	2	0	0	0
	%	0.0	25.6	0.0	5.2	15.4	0.0	0.0	0.0
		CHI SQ = 3.222 DF = 1 P = 0.073		CHI SQ = 0.163 DF = 1 P = 0.686		FISHER'S EXACT TEST DF = 1 P = 0.650			
NO PARTICIPATION IN GOVERNMENT PROGRAM	N	10	37	3	55	13	4	1	3
	n	0	4	0	1	4	0	0	1
	%	0.0	10.8	0.0	1.8	30.8	0.0	0.0	33.3
		CHI SQ = 1.182 DF = 1 P = 0.277		CHI SQ = 0.055 DF = 1 P = 0.814		FISHER'S EXACT TEST DF = 1 P = 0.300		FISHER'S EXACT TEST DF = 1 P = 0.750	

Table 9-11

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
VOCABULARY	80	Greene & Humphreys	d	
		St. Clair	-3.89*	1.46
		Maricopa	d	
		Mingo		
		Program		
		Head Start	-.95	1.36
		Non-Head Start		
		Constant		
		Statistics F = 3.78** R^2 = .33 MS_e = 33.36		
		Site		
2 CRITICAL ELEMENTS	80	Greene & Humphreys	d	
		St. Clair	-.38	.43
		Maricopa	.44	1.37
		Mingo		
		Program		
		Head Start	-.42	.38
		Non-Head Start		
		Constant	4.23	
		Statistics F = 1.65 R^2 = .19 MS_e = 2.58		

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[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

[d] Not in equation

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
3 CRITICAL ELEMENTS	80	Greene & Humphreys	d	
		St. Clair	.39	.46
		Maricopa	-1.77	1.44
		Mingo		
		Program		
		Head Start	.24	.40
		Constant	3.19	

Statistics F = 3.83** R^2 = .36 MS_e = 2.88

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[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

[d] Not in equation

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
4 CRITICAL ELEMENTS	80	Greene & Humphreys	d	
		St. Clair	d	
		Maricopa	-.29	1.55
		Mingo		
		Program		
		Head Start		
		Non-Head Start		
		Constant	1.80	
		Statistics F = 1.16 R^2 = .10 MS_e = 3.83		
		Site		
REPETITION	80	Greene & Humphreys	-.48	.54
		St. Clair	-.65	.60
		Maricopa	d	
		Mingo		
		Program		
		Head Start	.20	.46
		Non-Head Start	-.20	.46
		Constant	5.48	
		Statistics F = 2.14 R^2 = .24 MS_e = 3.73		

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

[d] Not in equation

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
ARTICULATION	80	Greene & Humphreys	1.49	.82
		St. Clair	-.77	.92
		Maricopa	d	
		Mingo		
		Program		
		Head Start	-.15	.69
		Non-Head Start		
		Constant	14.55	
		Statistics F = 12.12 R^2 = .61 MS_e = 8.69		
		Site		
NO. SPEECH PROBLEMS	80	Greene & Humphreys	-.65	.36
		St. Clair	d	
		Maricopa	.46	1.23
		Mingo		
		Program		
		Head Start	-.24	.31
		Non-Head Start	.24	.31
		Constant	2.77	
		Statistics F = 5.32 R^2 = .44 MS_e = 1.77		

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

[d] Not in equation

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
VOCABULARY	42	Head Start	2.70	1.42	F = 3.24
					R^2 = .44
		Constant	14.85		MS_e = 16.84
		St. Clair			
VOCABULARY	23	Head Start	-5.44	4.13	F = 2.00
					R^2 = .48
		Constant	-5.80		MS_e = 72.82
		Maricopa			
VOCABULARY	0	Head Start			F =
					R^2 =
		Constant			MS_e =
		Mingo			
VOCABULARY	15	Head Start	-1.15	1.95	F = .97
					R^2 = .49
		Constant	40.24		MS_e = 8.90

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
2 CRITICAL ELEMENTS	42	Head Start	Too Small To Enter		F = 1.83
		Non-Head Start			R^2 = .24
		Constant	4.49		MS_e = 2.51
		St. Clair			
2 CRITICAL ELEMENTS	23	Head Start	-1.56	1.02	F = .811
					R^2 = .27
		Constant	4.82		MS_e = 4.10
		Maricopa			
2 CRITICAL ELEMENTS	0	Head Start	Too Small To Enter		F =
		Non-Head Start			R^2 =
		Constant			MS_e =
		Mingo			
2 CRITICAL ELEMENTS	15	Head Start	-.60	.57	F = 1.91
					R^2 = .66
		Constant	1.21		MS_e = .67

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] SE_b	Statistics[c]
		Greene & Humphreys			
3 CRITICAL ELEMENTS	42	Head Start	.64	.59	F = 2.66
					R^2 = .39
		Constant	-1.46		MS_e = 2.96
		St. Clair			
3 CRITICAL ELEMENTS	23	Head Start	-.75	.67	F = 3.93
					R^2 = .65
		Constant	-4.01		MS_e = 1.93
		Maricopa			
3 CRITICAL ELEMENTS	0	Head Start			F =
					R^2 =
		Constant			MS_e =
		Mingo			
3 CRITICAL ELEMENTS	15	Head Start	Too Small To Enter		F = .45
					R^2 = .25
		Constant	2.73		MS_e = 3.30

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[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
4 CRITICAL ELEMENTS	42	Head Start	1.08	.72	F = .64
					R^2 = .13
		Constant	5.25		MS_e = 4.42
		St. Clair			
4 CRITICAL ELEMENTS	23	Head Start	-1.13	.93	F = 1.35
					R^2 = .39
		Constant	-1.67		MS_e = 3.65
		Maricopa			
4 CRITICAL ELEMENTS	0	Head Start			F =
					R^2 =
		Constant			MS_e =
		Mingo			
4 CRITICAL ELEMENTS	15	Head Start	-.66	1.01	F = 1.18
					R^2 = .47
		Constant	6.40		MS_e = 3.11

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] SE_b	Statistics[c]
		Greene & Humphreys			
REPETITION	42	Head Start	.74	.73	F = 1.84
					R^2 = .31
		Constant	7.10		MS_e = 4.15
		St. Clair			
REPETITION	23	Head Start	-1.21	.97	F = .70
					R^2 = .25
		Constant	5.46		MS_e = 3.79
		Maricopa			
REPETITION	0	Head Start			F =
					R^2 =
		Constant			MS_e =
		Mingo			
REPETITION	15	Head Start	Too Small	To Enter	F = 1.53
					R^2 = .53
		Constant	4.04		MS_e = 3.61

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures
Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
ARTICULATION	42				
		Head Start	-.30	.95	F = 7.15
					R^2 = .63
		Constant	21.07		MS_e = 7.44
		St. Clair			
ARTICULATION	23				
		Head Start	.61	1.55	F = 1.91
					R^2 = .42
		Constant	9.46		MS_e = 10.63
		Maricopa			
ARTICULATION	0				
		Head Start	Too Small To Enter		F =
					R^2 =
		Constant			MS_e =
		Mingo			
ARTICULATION	15				
		Head Start	-.89	1.55	F = 10.39
					R^2 = .91
		Constant	10.87		MS_e = 6.61

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-11 (continued)

Regression Analysis of Speech and Language Evaluation Measures Longitudinal Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
NO. SPEECH PROBLEMS	42	Head Start	-.19	.39	F = 6.36
					R^2 = .61
		Constant	1.53		MS_e = 1.29
		St. Clair			
NO. SPEECH PROBLEMS	23	Head Start	-.78	.89	F = 1.13
					R^2 = .35
		Constant	5.44		MS_e = 2.78
		Maricopa			
NO. SPEECH PROBLEMS	0	Head Start			F =
					R^2 =
		Constant			MS_e =
		Mingo			
NO. SPEECH PROBLEMS	15	Head Start	.75	.72	F = 4.00
					R^2 = .80
		Constant	-.18		MS_e = 1.24

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-12

Comparison of Pre/Posttest Speech and Language Comprehension Deficiencies

Failure at Posttest		Longitudinal Children (Sample A) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Passed at Pre	Failed at Pre	Passed at Pre	Failed at Pre	Passed at Pre	Failed at Pre	Passed at Pre	Failed at Pre	Passed at Pre	Failed at Pre
Head Start											
Any Deficiency	n %	2/ 12 16.7	13/ 27 48.1	1/ 7 14.3	7/ 13 58.3			1/ 2 50.0	7/ 13 53.8	4/ 21 19.0	27/ 52 51.9
		p = 0.062		FET = 0.080				FET = 0.733		p = 0.010	
Speech	n %	3/ 22 13.6	8/ 15 53.3	1/ 12 8.3	3/ 7 42.9			1/ 3 33.3	5/ 10 50.0	5/ 37 13.5	16/ 32 50.0
		p = 0.009		FET = 0.117				FET = 0.563		p = 0.001	
Language	n %	1/ 14 7.1	8/ 25 32.0	1/ 10 10.0	6/ 9 66.7			1/ 8 12.5	3/ 7 42.9	3/ 32 9.4	17/ 41 41.5
		p = 0.007		FET = 0.017				FET = 0.231		p = 0.002	
Non-Head Start											
Any Deficiency	n %	0/ 5 6.0	13/ 20 65.0	3/ 8 37.5	3/ 4 75.0			0/ 2 0.0	8/ 11 72.7	3/ 15 20.0	24/ 35 68.6
		p = 0.009		FET = 0.273				FET = 0.128		p = 0.002	
Speech	n %	1/ 9 11.1	4/ 15 26.7	3/ 9 33.3	2/ 3 66.7			2/ 5 40.0	4/ 6 66.7	6/ 23 26.1	10/ 24 41.7
		p = 0.364		FET = 0.364				FET = 0.392		p = 0.260	
Language	n %	1/ 10 10.0	9/ 15 60.0	3/ 10 30.0	0/ 2 0.0			0/ 4 0.0	4/ 9 44.4	4/ 24 16.7	13/ 26 50.0
		p = 0.012		FET = 0.545				FET = 0.176		p = 0.013	

Table 9-13

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
VOCABULARY	551	Greene & Humphreys	-.73*	.35
		St. Clair	-.96**	4.0
		Maricopa	.89	.46
		Mingo		
		Program		
		Head Start	.21	.43
		Non-Head Start		
		Constant	21.13	
	Statistics	F = 29.82** R^2 = .36		MS_e = 22.73
		Site		
2 CRITICAL ELEMENTS	551	Greene & Humphreys	-.24*	.12
		St. Clair	-.31*	.13
		Maricopa	.47**	.15
		Mingo		
		Program		
		Head Start	.15	
		Non-Head Start		
		Constant	3.11	
	Statistics	F = 16.16** R^2 = .23		MS_e = 2.46

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
3 CRITICAL ELEMENTS	551	Greene & Humphreys	-.33*	.14
		St. Clair	-.40*	.16
		Maricopa	.66**	.18
		Mingo		
		Program		
		Head Start	.25	.18
		Non-Head Start		
		Constant	-.81	
	Statistics	F = 23.48** R^2 = .30 MS_e = 3.43		
		Site		
4 CRITICAL ELEMENTS	551	Greene & Humphreys	-.41**	.14
		St. Clair	-.46**	.16
		Maricopa	.72**	.19
		Mingo		
		Program		
		Head Start	-.09	.18
		Non-Head Start		
		Constant	-1.73	
	Statistics	F = 18.73** R^2 = .26 MS_e = 3.77		

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
ARTICULATION	551	Greene & Humphreys	.39	.32
		St. Clair	.25	.36
		Maricopa	.93*	.41
		Mingo		
		Program		
		Head Start	-.06	.39
		Non-Head Start		
		Constant	17.50	
	Statistics	F = 10.07**	R^2 = .16	MS_e = 18.46
		Site		
NO. SPEECH PROBLEMS	551	Greene & Humphreys	.06	.12
		St. Clair	.30*	.14
		Maricopa	-.41*	.16
		Mingo		
		Program		
		Head Start	-.10	.15
		Non-Head Start		
		Constant	4.01	
	Statistics	F = 6.46**	R^2 = .11	MS_e = 2.73

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
REPETITION	551	Greene & Humphreys	.35*	.17
		St. Clair	-.36	.19
		Maricopa	-.21	.22
		Mingo		
		Program		
		Head Start		
		Non-Head Start		
		Constant	2.60	
	Statistics	F = 10.10**	R^2 = .14	MS_e = 5.13

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[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
VOCABULARY	174				
		Head Start	1.13	.83	F = 9.94**
					R^2 = .30
		Constant	22.74		MS_e = 25.81
		St. Clair			
VOCABULARY	140				
		Head Start	.49	1.06	F = 7.06**
					R^2 = .27
		Constant	9.26		MS_e = 35.87
		Maricopa			
VOCABULARY	94				
		Head Start	.14	.62	F = 2.12*
					R^2 = .15
		Constant	41.47		MS_e = 6.81
		Mingo			
VOCABULARY	143				
		Head Start	-.79	.74	F = 12.23**
					R^2 = .39
		Constant	23.43		MS_e = 14.91

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
2 CRITICAL ELEMENTS	174	Head Start	.24	.26	F = 6.23**
					R^2 = .21
		Constant	3.44		MS_e = 2.61
		St. Clair			
2 CRITICAL ELEMENTS	140	Head Start	.19	.32	F = 3.39**
					R^2 = .15
		Constant	2.26		MS_e = 3.22
		Maricopa			
2 CRITICAL ELEMENTS	94	Head Start	-.20	.24	F = .87
					R^2 = .07
		Constant	7.83		MS_e = 1.04
		Mingo			
2 CRITICAL ELEMENTS	143	Head Start	.25	.30	F = 5.50**
					R^2 = .22
		Constant	2.03		MS_e = 2.47

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
3 CRITICAL ELEMENTS	174	Head Start	.67*	.32	F = 10.16**
					R^2 = .30
		Constant	.18		MS_e = 3.71
		St. Clair			
3 CRITICAL ELEMENTS	140	Head Start	.13	.31	F = 8.15**
					R^2 = .27
		Constant	-2.07		MS_e = 3.00
		Maricopa			
3 CRITICAL ELEMENTS	94	Head Start	-.27	.34	F = 1.96
					R^2 = .14
		Constant	.49		MS_e = 2.11
		Mingo			
3 CRITICAL ELEMENTS	143	Head Start	.14	.40	F = 4.98**
					R^2 = .21
		Constant	-1.32		MS_e = 4.28

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE$_b$	Statistics[c]
		Greene & Humphreys			
4 CRITICAL ELEMENTS	174	Head Start	.34	.33	F = 5.58**
					R^2 = .19
		Constant	.54		MS$_e$ = 4.01
		St. Clair			
4 CRITICAL ELEMENTS	140	Head Start	too small to enter		F = 4.38**
					R^2 = .17
		Constant	-1.89		MS$_e$ = 3.50
		Maricopa			
4 CRITICAL ELEMENTS	94	Head Start	-.26	.44	F = 2.89**
					R^2 = .19
		Constant	-3.83		MS$_e$ = 3.40
		Mingo			
4 CRITICAL ELEMENTS	143	Head Start	-.28	.39	F = 5.42**
					R^2 = .22
		Constant	-2.47		MS$_e$ = 4.06

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS$_e$ is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
REPETITION	174				
		Head Start	too small to enter		F = 4.05**
					R^2 = .13
		Constant	2.25		MS_e = 5.12
		St. Clair			
REPETITION	140				
		Head Start	-.39	.40	F = 5.48**
					R^2 = .23
		Constant	-.19		MS_e = 5.13
		Maricopa			
REPETITION	94				
		Head Start	.19	.51	F = 1.13
					R^2 = .08
		Constant	1.89		MS_e = 4.66
		Mingo			
REPETITION	143				
		Head Start	.41	.44	F = 5.57**
					R^2 = .22
		Constant	.75		MS_e = 5.23

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
ARTICULATION	174				
		Head Start	-.78	.70	F = 3.96**
					R^2 = .14
		Constant	19.44		MS_e = 18.55
		St. Clair			
ARTICULATION	140				
		Head Start	-.43	.68	F = 1.31
					R^2 = .07
		Constant	25.03		MS_e = 14.82
		Maricopa			
ARTICULATION	94				
		Head Start	-.53	.64	F = 3.11**
					R^2 = .20
		Constant	15.82		MS_e = 7.19
		Mingo			
ARTICULATION	143				
		Head Start	2.26*	1.00	F = 4.94**
					R^2 = .20
		Constant	8.34		MS_e = 27.19

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-13 (continued)

Regression Analysis of Speech and Language Evaluation Measures
All Posttest Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
NO. SPEECH PROBLEMS	174	Head Start	-.11	.26	F = 4.48**
					R^2 = .16
		Constant	3.72		MS_e = 2.61
		St. Clair			
NO. SPEECH PROBLEMS	140	Head Start	too small to enter		F = 1.79
					R^2 = .07
		Constant	5.45		MS_e = 3.51
		Maricopa			
NO. SPEECH PROBLEMS	94	Head Start	.24	.32	F = 2.34*
					R^2 = .16
		Constant	1.92		MS_e = 1.84
		Mingo			
NO. SPEECH PROBLEMS	143	Head Start	-.69*	.30	F = 2.69*
					R^2 = .12
		Constant	3.89		MS_e = 2.58

[a] Adjusted for age, gender, race, per capita income, family employment status and mother's education

[b] Centered without weights

[c] MS_e is residual mean square

Table 9-14

SPEECH AND LANGUAGE MEASURES FOR 3 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)	103	36.00	40.00	44.50	39.60	5.72	123	34.50	39.00	44.00	37.41	8.93	2.22	0.027
2 CRITICAL ELEMENTS	103	7.00	8.00	9.00	7.37	1.78	121	5.00	7.00	8.00	6.32	2.60	3.56	0.000
3 CRITICAL ELEMENTS	103	4.00	5.00	7.00	5.32	2.19	120	3.00	5.00	6.00	4.52	2.34	2.65	0.009
4 CRITICAL ELEMENTS	103	2.00	4.00	5.00	3.84	1.94	119	2.00	4.00	5.00	3.52	2.20	1.17	0.245
ARTICULATION	93	22.00	25.00	27.00	24.45	3.57	111	18.00	23.00	27.00	21.36	7.22	3.97	0.000
SENTENCE REPITITION	93	6.00	8.00	9.00	7.05	2.72	117	3.00	7.00	9.00	5.86	3.46	2.79	0.006
NUMBER OF PROBLEMS	95	0.00	1.00	2.00	1.21	1.41	91	0.00	1.00	3.00	1.97	2.01	-2.96	0.004

Table 9-15

SPEECH AND LANGUAGE MEASURES FOR 4 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)	198	41.00	44.00	46.00	42.39	6.92	145	39.00	44.00	47.00	42.50	5.97	-0.15	0.883
2 CRITICAL ELEMENTS	197	7.00	8.00	9.00	8.02	1.72	145	7.00	8.00	9.00	7.83	1.89	0.91	0.366
3 CRITICAL ELEMENTS	197	5.00	7.00	8.00	6.43	1.99	144	5.00	6.00	7.50	5.89	2.21	2.31	0.021
4 CRITICAL ELEMENTS	197	4.00	5.00	6.00	4.66	1.94	144	3.00	5.00	6.00	4.71	2.03	-0.20	0.843
ARTICULATION	173	22.00	26.00	28.00	24.29	5.36	117	23.00	26.00	28.00	24.74	5.13	-0.72	0.473
SENTENCE REPITITION	174	7.00	9.00	10.00	7.77	2.50	118	7.00	9.00	10.00	7.70	2.61	0.22	0.828
NUMBER OF PROBLEMS	179	0.00	1.00	3.00	1.58	1.94	124	0.00	1.00	2.00	1.56	1.76	0.09	0.930

Table 9-15 (continued)

SPEECH AND LANGUAGE MEASURES FOR 4 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE (EXCLUDING MARICOPA COUNTY)

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)	169	40.00	43.00	46.00	42.02	7.08	127	39.00	43.00	46.00	42.00	6.17	0.03	0.976
2 CRITICAL ELEMENTS	170	7.00	8.00	9.00	7.84	1.76	127	7.00	8.00	9.00	7.65	1.92	0.90	0.369
3 CRITICAL ELEMENTS	170	5.00	6.00	8.00	6.33	2.05	126	4.00	6.00	7.00	5.62	2.15	2.87	0.004
4 CRITICAL ELEMENTS	170	3.00	5.00	6.00	4.48	1.92	126	3.00	4.50	6.00	4.50	2.01	-0.08	0.939
ARTICULATION	147	21.00	26.00	28.00	23.93	5.55	106	22.00	26.00	28.00	24.48	5.30	-0.80	0.426
SENTENCE REPITITION	148	7.00	9.00	10.00	7.78	2.57	107	6.50	9.00	10.00	7.70	2.61	0.23	0.817
NUMBER OF PROBLEMS	153	0.00	1.00	3.00	1.73	1.99	108	0.00	1.00	3.00	1.69	1.82	0.17	0.866

Table 9-16

SPEECH AND LANGUAGE MEASURES FOR 5 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)	122	45.00	47.00	48.00	45.93	3.52	52	45.00	46.50	48.00	45.50	4.04	0.67	0.502
2 CRITICAL ELEMENTS	122	8.00	9.00	10.00	8.76	1.33	51	9.00	3.00	10.00	9.04	1.26	-1.29	0.199
3 CRITICAL ELEMENTS	122	7.00	8.00	9.00	7.66	1.81	51	7.00	8.00	9.00	7.98	1.57	-1.18	0.239
4 CRITICAL ELEMENTS	122	5.00	6.00	8.00	6.32	2.16	51	5.00	7.00	8.00	6.76	2.09	-1.26	0.210
ARTICULATION	112	25.00	28.00	29.00	26.44	3.89	40	23.50	28.00	29.50	25.97	4.88	0.54	0.590
SENTENCE REPITITION	113	8.00	9.00	10.00	8.47	1.91	39	7.00	9.00	10.00	8.26	2.19	0.54	0.591
NUMBER OF PROBLEMS	108	0.00	0.00	2.00	1.06	1.53	45	0.00	0.00	1.00	0.98	1.51	0.32	0.748

Table 9-16 (continued)

SPEECH AND LANGUAGE MEASURES FOR 5 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE (EXCLUDING MARICOPA COUNTY)

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)	69	44.00	46.00	49.00	45.78	3.62	23	45.00	47.00	49.00	45.83	4.59	-0.04	0.967
2 CRITICAL ELEMENTS	70	8.00	9.00	10.00	8.53	1.45	23	8.50	9.00	10.00	8.78	1.41	-0.74	0.462
3 CRITICAL ELEMENTS	70	6.00	8.00	9.00	7.37	1.80	23	6.50	8.00	9.00	7.83	1.67	-1.11	0.273
4 CRITICAL ELEMENTS	70	5.00	6.00	8.00	6.01	2.20	23	5.00	7.00	8.00	6.65	2.19	-1.21	0.233
ARTICULATION	60	24.00	27.50	29.00	26.03	4.32	20	23.00	28.00	30.00	25.35	5.80	0.48	0.632
SENTENCE REPITITION	62	8.00	9.00	10.00	8.61	1.96	20	8.00	9.50	10.00	8.45	2.16	0.30	0.767
NUMBER OF PROBLEMS	62	0.00	1.00	2.00	1.23	1.44	21	0.00	1.00	2.00	1.52	1.86	-0.67	0.509

Table 9-17

SPEECH AND LANGUAGE MEASURES FOR 3 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)														
Greene/Humphreys	42	37.00	40.00	45.00	40.24	5.28	42	34.00	38.00	40.00	35.98	7.95	2.90	0.005
St.Clair	34	35.00	38.00	43.00	38.21	5.99	35	30.00	35.00	39.50	33.09	10.90	2.43	0.018
Mingo	27	38.00	41.00	45.00	40.37	5.98	46	39.00	44.00	46.00	42.02	5.58	-1.17	0.249
2 CRITICAL ELEMENTS														
Greene/Humphreys	42	7.00	8.00	9.00	7.40	1.62	41	5.00	7.00	8.00	5.93	2.74	2.98	0.004
St.Clair	34	6.00	8.00	8.00	7.26	2.05	35	4.00	6.00	8.00	5.69	2.73	2.72	0.008
Mingo	27	6.50	8.00	9.00	7.44	1.72	45	7.00	8.00	9.00	7.18	2.14	0.58	0.563
3 CRITICAL ELEMENTS														
Greene/Humphreys	42	4.00	5.50	7.00	5.38	2.21	40	3.00	5.00	6.00	4.25	2.20	2.32	0.023
St.Clair	34	4.00	5.00	6.00	5.00	2.12	35	3.00	4.00	6.00	4.00	2.13	1.96	0.055
Mingo	27	3.50	6.00	8.00	5.63	2.29	45	3.00	5.00	7.00	5.18	2.50	0.82	0.415
4 CRITICAL ELEMENTS														
Greene/Humphreys	42	3.00	4.50	5.00	4.12	2.11	40	1.00	3.00	4.00	2.97	2.06	2.49	0.015
St.Clair	34	2.00	4.00	5.00	3.62	1.83	35	2.00	3.00	4.00	3.14	2.28	0.96	0.342
Mingo	27	2.50	3.00	5.00	3.70	1.81	44	3.00	4.00	5.50	4.32	2.07	-1.31	0.194

Table 9-17 (continued)

SPEECH AND LANGUAGE MEASURES FOR 3 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
ARTICULATION														
Greene/Humphreys	40	22.00	25.00	28.00	24.63	3.70	37	17.00	25.00	27.00	21.00	9.53	2.17	0.035
St.Clair	27	22.50	25.00	27.00	24.81	3.28	33	22.00	25.00	27.00	24.27	3.61	0.61	0.545
Mingo	26	21.00	24.00	27.00	23.81	3.72	41	16.00	20.00	23.00	19.34	6.31	3.64	0.001
SENTENCE REPITITION														
Greene/Humphreys	39	6.00	8.00	9.00	7.41	2.53	39	2.50	7.00	8.50	5.87	3.89	2.07	0.042
St.Clair	28	6.00	8.00	9.00	7.04	2.56	34	4.00	7.00	9.00	6.00	3.17	1.42	0.160
Mingo	26	4.00	7.00	9.00	6.54	3.14	44	2.00	7.00	9.00	5.75	3.33	0.99	0.326
NUMBER OF PROBLEMS														
Greene/Humphreys	39	0.00	1.00	2.00	1.15	1.41	32	0.00	1.00	2.50	1.59	1.81	-1.12	0.266
St.Clair	31	0.00	1.00	2.00	1.26	1.55	29	1.00	1.00	3.00	2.21	2.13	-1.96	0.055
Mingo	25	0.00	1.00	2.00	1.24	1.27	30	0.00	2.00	3.00	2.13	2.11	-1.94	0.059

Table 9-18

SPEECH AND LANGUAGE MEASURES FOR 4 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)														
Greene/Humphreys	58	40.00	43.00	45.00	41.86	6.20	49	38.00	42.00	45.00	40.18	6.64	1.34	0.182
St.Clair	54	38.00	42.00	47.00	40.31	9.36	38	37.00	43.00	46.00	42.03	5.69	-1.09	0.280
Maricopa	29	44.00	46.00	47.00	44.55	5.52	18	45.00	46.00	47.00	46.00	2.30	-1.25	0.219
Mingo	57	43.00	45.00	46.00	43.81	4.70	40	42.00	45.50	48.50	44.20	5.38	-0.37	0.710
2 CRITICAL ELEMENTS														
Greene/Humphreys	58	7.00	8.00	9.00	7.81	1.82	49	6.00	8.00	9.00	7.43	1.76	1.07	0.286
St.Clair	54	7.00	8.00	9.00	7.69	1.81	38	7.00	8.00	9.00	8.00	1.66	-0.84	0.403
Maricopa	27	9.00	9.00	10.00	9.11	0.97	18	9.00	9.00	10.00	9.17	0.92	-0.19	0.848
Mingo	58	7.00	8.00	9.00	8.02	1.41	40	7.00	8.00	9.00	7.57	2.31	1.08	0.284
3 CRITICAL ELEMENTS														
Greene/Humphreys	58	5.00	6.00	8.00	6.29	2.19	49	4.00	5.00	7.00	5.16	1.91	2.85	0.005
St.Clair	51	5.00	6.00	8.00	6.28	2.04	38	5.00	6.00	7.00	5.71	2.10	1.29	0.201
Maricopa	27	6.00	7.00	8.00	7.04	1.51	18	7.00	8.00	9.00	7.78	1.66	-1.52	0.138
Mingo	58	6.00	7.00	8.00	6.41	1.93	39	4.50	6.00	8.00	6.10	2.39	0.68	0.500
4 CRITICAL ELEMENTS														
Greene/Humphreys	58	3.00	4.00	5.00	4.21	1.85	49	3.00	4.00	5.00	4.18	1.70	0.07	0.946
St.Clair	54	4.00	5.00	6.00	4.59	1.78	38	3.00	4.00	6.00	4.58	2.05	0.03	0.974
Maricopa	27	4.50	6.00	7.00	5.81	1.66	18	5.00	6.50	7.00	6.17	1.54	-0.73	0.472
Mingo	58	4.00	5.00	6.00	4.66	2.12	39	3.00	5.00	7.00	4.82	2.30	-0.36	0.721

Table 9-18 (continued)

SPEECH AND LANGUAGE MEASURES FOR 4 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
ARTICULATION														
Greene/Humphreys	48	23.00	27.00	29.00	25.06	5.00	42	23.00	25.50	29.00	24.71	4.96	0.33	0.742
St.Clair	46	21.00	26.00	28.00	23.93	5.47	34	24.00	26.00	28.00	24.84	5.00	-0.85	0.395
Maricopa	26	25.00	27.00	28.00	26.35	3.50	11	26.50	27.00	28.00	27.27	1.62	-1.10	0.279
Mingo	53	20.00	25.00	27.00	22.91	5.98	30	20.00	25.00	29.00	23.63	6.11	-0.53	0.601
SENTENCE REPITITION														
Greene/Humphreys	48	8.00	9.00	10.00	8.21	2.58	42	7.00	9.00	10.00	8.05	2.38	0.31	0.759
St.Clair	46	7.00	8.00	9.00	7.54	2.53	34	7.00	9.00	10.00	7.71	2.70	-0.27	0.786
Maricopa	26	7.00	8.00	9.00	7.73	2.15	11	7.00	8.00	10.00	7.73	2.76	0.00	0.997
Mingo	54	7.00	8.50	10.00	7.59	2.58	31	6.00	8.00	9.00	7.23	2.81	0.60	0.553
NUMBER OF PROBLEMS														
Greene/Humphreys	55	0.00	1.00	3.00	1.71	1.83	45	0.00	1.00	3.00	1.64	1.84	0.18	0.861
St.Clair	52	0.00	1.00	3.00	1.69	2.09	36	0.00	1.00	2.00	1.67	2.00	0.06	0.954
Maricopa	26	0.00	0.00	1.00	0.69	1.29	16	0.00	0.00	1.00	0.69	0.95	0.01	0.989
Mingo	46	0.00	1.00	3.00	1.78	2.10	27	0.50	1.00	3.00	1.78	1.60	0.01	0.991

Table 9-19

SPEECH AND LANGUAGE MEASURES FOR 5 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS
BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
VOCABULARY (ACLC)														
Greene/Humphreys	19	44.50	46.00	49.00	46.58	2.55	5	43.00	46.00	50.00	45.00	5.03	0.59	0.586
St.Clair	19	40.00	44.00	47.00	43.58	3.95	6	36.00	47.00	48.00	43.67	6.83	-0.03	0.997
Maricopa	53	46.00	47.00	48.00	46.13	3.42	29	45.00	46.00	47.00	45.24	3.60	1.09	0.281
Mingo	31	45.00	47.00	49.50	46.64	3.49	12	45.50	47.00	49.00	47.25	1.86	-0.73	0.469
2 CRITICAL ELEMENTS														
Greene/Humphreys	19	8.00	9.00	9.00	8.68	0.88	5	8.00	9.00	9.00	8.20	1.30	0.78	0.468
St.Clair	20	7.50	9.00	9.00	8.05	1.93	6	6.00	9.00	10.00	8.17	2.14	-0.12	0.908
Maricopa	52	9.00	9.00	10.00	9.08	1.08	28	9.00	10.00	10.00	9.25	1.11	-0.67	0.505
Mingo	31	8.00	9.00	10.00	8.74	1.84	12	9.00	9.50	10.00	9.33	0.78	-1.80	0.081
3 CRITICAL ELEMENTS														
Greene/Humphreys	19	7.00	8.00	9.00	7.84	1.80	5	7.00	7.00	9.00	7.60	1.34	0.33	0.748
St.Clair	20	5.50	7.00	8.00	6.95	1.70	6	5.00	8.50	10.00	7.83	2.32	-0.87	0.415
Maricopa	52	7.00	8.00	9.00	8.04	1.78	28	7.00	8.00	9.00	8.11	1.50	-0.18	0.856
Mingo	31	6.50	7.00	9.00	7.35	1.84	12	6.50	8.50	9.00	7.92	1.56	-1.00	0.325
4 CRITICAL ELEMENTS														
Greene/Humphreys	19	5.00	6.00	7.50	6.21	1.81	5	5.00	7.00	7.00	6.40	1.34	-0.26	0.802
St.Clair	20	4.00	6.00	7.00	5.50	2.33	6	5.00	5.50	7.00	5.83	2.64	-0.28	0.789
Maricopa	52	6.00	7.00	8.00	6.73	2.07	28	5.00	7.00	8.00	6.86	2.05	-0.26	0.794
Mingo	31	5.00	6.00	8.00	6.23	2.33	12	6.50	8.00	8.50	7.17	2.25	-1.22	0.237

Table 9-19 (CONTINUED)

SPEECH AND LANGUAGE MEASURES FOR 5 YEAR OLD CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

	HEAD START						NON-HEAD START							
	N	Q1	MED	Q3	MEAN	SD	N	Q1	MED	Q3	MEAN	SD	T	P
ARTICULATION														
Greene/Humphreys	17	27.00	29.00	29.00	27.06	3.93	3	-----	-----	-----	27.33	3.06	-0.14	0.900
St.Clair	16	25.00	27.50	28.50	25.69	5.49	6	23.00	26.00	30.00	25.83	4.36	-0.06	0.949
Maricopa	52	25.50	28.00	29.00	26.90	3.31	20	26.00	28.00	29.00	26.60	3.79	0.32	0.755
Mingo	27	23.50	26.00	29.00	25.59	3.81	11	21.50	28.00	30.00	24.54	7.10	0.46	0.652
SENTENCE REPITITION														
Greene/Humphreys	17	9.00	10.00	10.00	9.00	1.58	3	-----	-----	-----	9.33	1.16	-0.43	0.694
St.Clair	16	6.50	8.00	10.00	7.63	2.63	6	8.00	10.00	10.00	8.83	2.04	-1.14	0.277
Maricopa	51	7.00	9.00	10.00	8.29	1.86	19	7.00	9.00	10.00	8.05	2.25	0.42	0.679
Mingo	29	9.00	9.00	10.00	8.93	1.58	11	7.50	9.00	10.00	8.00	2.45	1.17	0.262
NUMBER OF PROBLEMS														
Greene/Humphreys	18	0.00	0.00	2.00	0.89	1.32	5	0.00	0.00	2.00	0.80	1.10	0.15	0.882
St.Clair	19	0.00	1.00	3.00	1.79	1.96	6	0.00	0.50	4.00	1.83	2.56	-0.04	0.970
Maricopa	46	0.00	0.00	1.00	0.85	1.63	24	0.00	0.00	1.00	0.50	0.93	1.13	0.261
Mingo	25	0.00	1.00	2.00	1.04	0.89	10	0.00	1.00	3.00	1.70	1.77	-1.13	0.284

CHAPTER TEN

APPENDIX TABLES

Table 10-1

Comparison of Evaluation Findings and those Reported in Head Start Health Records

Head Start Records		Head Start Children (Samples A, B, and C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings
Vision	N	9	43	10	40	13	88	4	32	36	203
Agree	n	4	42	2	40	5	77	1	30	12	189
	%	44.4	97.7	20.0	100.0	38.5	87.5	25.0	93.8	33.3	93.1
Disagree	n	5	1	8	0	8	11	3	2	24	14
	%	55.6	2.3	80.0	0.0	61.5	12.5	75.0	6.3	66.7	6.9
		$p < 0.01$		$p < 0.01$		$p < 0.021$		$p < 0.20$		$p < 0.01$	

Table 10-2

Comparison of Pretest and Posttest Deficiencies

Vision Measure		Longitudinal (Sample A) Children in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		A*	B*	A*	B*	A*	B*	A*	B*	A*	B*
Head Start											
Any Deficiency (Evaluation definition)	n	2/ 7	6/ 34	5/ 11	2/ 14	7/ 13	12/ 27	3/ 3	1/ 14	17/ 34	21/ 89
	%	28.6	17.6	45.5	14.3	53.8	44.4	100.0	7.1	50.0	23.6
		$p < 0.507$		$p < 0.085$		$p < 0.577$		FET = 0.006		$p < 0.005$	
Any Deficiency (Head Start definition)	n	1/ 6	1/ 1	2/ 11	0/ 0	2/ 13	0/ 0	2/ 3	0/ 0	7/ 33	1/ 1
	%	16.7	100.0	18.2		15.4		66.7		21.2	100.0
		FET = 0.286								$p = 0.067$	
Non-Head Start											
Any Deficiency (Evaluation definition)	n	0/ 0	5/ 28	4/ 7	1/ 7	4/ 4	7/ 11	3/ 3	3/ 13	11/ 14	16/ 59
	%		17.9	57.1	14.3	100.0	63.6	100.0	23.1	78.6	27.1
				FET = 0.133		FET = 0.242		FET = 0.036		$p = 0.000$	
Any Deficiency (Head Start definition	n	0/ 0	0/ 0	1/ 7	0/ 0	0/ 4	0/ 0	2/ 3	0/ 0	3/ 14	0/ 0
	%			14.3		0.0		66.7		21.4	
		FET = 0.286								$p = 0.067$	

*A: Children diagnosed to have vision deficiencies at pretest but not at posttest.

*B: Children diagnosed to have no vision deficiencies at pretest but found to have problems at posttest.

Table 10-3

VISION PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START			NON-HEAD START					
	N	n	%	N	n	%	CHI SQ	DF	P
ANY DEFICIENCY	457	144	31.5	347	117	33.7	0.438	1	0.508
OCULOMOTILITY	454	100	22.0	349	74	21.2	0.079	1	0.779
STEREO ACUITY	445	89	20.0	333	55	16.5	1.532	1	0.216
BINOCULAR FUNCTION	449	117	26.1	324	96	29.6	1.203	1	0.273
STRABISMUS	458	35	7.6	350	38	10.9	2.495	1	0.114
CONVERGENCE	458	24	5.2	348	20	5.7	0.092	1	0.761
HYPEROPIA	448	27	6.0	339	14	4.1	1.406	1	0.236
MYOPIA	448	2	0.4	339	4	1.2	1.372	1	0.241
ASTIGMATISM	448	38	8.5	342	39	11.4	1.882	1	0.170
VISUAL ACUITY	427	10	2.3	307	9	2.9	0.246	1	0.620

Table 10-4

VISION PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
ANY DEFICIENCY	N	127	99	106	83	106	60	118	105
	n	34	24	30	27	55	37	25	29
	%	26.8	24.2	28.3	32.5	51.9	61.7	21.2	27.6
		CHI SQ = 0.187		CHI SQ = 0.395		CHI SQ = 1.483		CHI SQ = 1.253	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.666		P = 0.530		P = 0.223		P = 0.263	
OCULOMOTILITY	N	127	100	105	84	104	60	118	105
	n	4	4	37	24	15	9	44	37
	%	3.1	4.0	35.2	28.6	14.4	15.0	37.3	35.2
		CHI SQ = 0.119		CHI SQ = 0.949		CHI SQ = 0.010		CHI SQ = 0.101	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.730		P = 0.330		P = 0.920		P = 0.751	
STEREO ACUITY	N	127	95	101	76	106	60	111	102
	n	24	8	27	16	15	9	23	22
	%	18.9	8.4	26.7	21.1	14.2	15.0	20.7	21.6
		CHI SQ = 4.835		CHI SQ = 0.761		CHI SQ = 0.022		CHI SQ = 0.023	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.028		P = 0.383		P = 0.881		P = 0.880	
BINOCULAR FUNCTION	N	127	85	105	80	104	60	113	99
	n	32	20	18	22	36	30	31	24
	%	25.2	23.5	17.1	27.5	34.6	50.0	27.4	24.2
		CHI SQ = 0.076		CHI SQ = 2.874		CHI SQ = 3.746		CHI SQ = 0.280	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.782		P = 0.090		P = 0.053		P = 0.597	
STRABISMUS	N	127	100	106	84	106	60	119	105
	n	7	13	5	9	16	10	7	6
	%	5.5	13.0	4.7	10.7	15.1	16.7	5.9	5.7
		CHI SQ = 3.905		CHI SQ = 2.470		CHI SQ = 0.072		CHI SQ = 0.005	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.048		P = 0.116		P = 0.789		P = 0.943	

Table 10-4 (continued)

VISION PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
CONVERGENCE	N	127	100	106	84	106	60	119	105
	n	2	3	11	8	2	2	9	7
	%	1.6	3.0	10.4	9.5	1.9	3.3	7.6	6.7
		CHI SQ = 0.528 DF = 1 P = 0.463		CHI SQ = 0.038 DF = 1 P = 0.846		CHI SQ = 0.341 DF = 1 P = 0.559		CHI SQ = 0.068 DF = 1 P = 0.795	
HYPEROPIA	N	124	97	105	80	104	60	115	102
	n	1	1	9	1	6	2	11	10
	%	0.8	1.0	8.6	1.3	5.8	3.3	9.6	9.8
		CHI SQ = 0.031 DF = 1 P = 0.861		CHI SQ = 4.760 DF = 1 P = 0.029		CHI SQ = 0.487 DF = 1 P = 0.485		CHI SQ = 0.004 DF = 1 P = 0.953	
MYOPIA	N	124	97	105	80	104	60	115	102
	n	0	1	1	2	0	0	1	1
	%	0.0	1.0	1.0	2.5	0.0	0.0	0.9	1.0
		CHI SQ = 1.284 DF = 1 P = 0.257		CHI SQ = 0.682 DF = 1 P = 0.409				CHI SQ = 0.007 DF = 1 P = 0.932	
ASTIGMATISM	N	127	101	106	84	106	61	109	96
	n	3	4	16	12	13	11	6	12
	%	2.4	4.0	15.1	14.3	12.3	18.0	5.5	12.5
		CHI SQ = 0.483 DF = 1 P = 0.487		CHI SQ = 0.024 DF = 1 P = 0.876		CHI SQ = 1.047 DF = 1 P = 0.306		CHI SQ = 3.119 DF = 1 P = 0.077	
VISUAL ACUITY	N	125	91	93	66	104	59	105	91
	n	2	1	3	2	1	1	4	5
	%	1.6	1.1	3.2	3.0	1.0	1.7	3.8	5.5
		CHI SQ = 0.097 DF = 1 P = 0.756		CHI SQ = 0.005 DF = 1 P = 0.944		CHI SQ = 0.167 DF = 1 P = 0.683		CHI SQ = 0.316 DF = 1 P = 0.574	

Table 10-4 (continued)

VISION PROBLEMS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	n	%	N	n	%	N	n	%	N	n	%
ANY DEFICIENCY												
Sample A	74	14	18.9	41	13	31.7	56	30	53.6	35	10	28.6
Sample B	56	8	14.3	40	13	32.5	11	6	54.5	31	5	16.1
Sample C	96	36	37.5	108	31	28.7	99	56	56.6	157	39	24.8
	CHI SQ = 12.615 DF = 2 P = 0.002			CHI SQ = 0.259 DF = 2 P = 0.878			CHI SQ = 0.133 DF = 2 P = 0.935			CHI SQ = 1.500 DF = 2 P = 0.472		
OCULOMOTILITY												
Sample A	74	1	1.4	42	14	33.3	55	3	5.5	35	14	40.0
Sample B	56	1	1.8	40	13	32.5	11	3	27.3	31	16	51.6
Sample C	97	6	6.2	107	34	31.8	98	18	18.4	157	51	32.5
	CHI SQ = 3.546 DF = 2 P = 0.170			CHI SQ = 0.035 DF = 2 P = 0.983			CHI SQ = 6.210 DF = 2 P = 0.045			CHI SQ = 4.338 DF = 2 P = 0.114		
STEREO ACUITY												
Sample A	73	8	11.0	41	12	29.3	56	7	12.5	31	11	35.5
Sample B	54	13	24.1	36	9	25.0	11	2	18.2	30	4	13.3
Sample C	95	11	11.6	100	22	22.0	99	15	15.2	152	30	19.7
	CHI SQ = 5.410 DF = 2 P = 0.067			CHI SQ = 0.847 DF = 2 P = 0.655			CHI SQ = 0.335 DF = 2 P = 0.846			CHI SQ = 5.104 DF = 2 P = 0.078		
BINOCULAR FUNCTION												
Sample A	71	14	19.7	41	10	24.4	56	17	30.4	33	13	39.4
Sample B	53	6	11.3	39	11	28.2	11	5	45.5	30	8	26.7
Sample C	88	32	36.4	105	19	18.1	97	44	45.4	149	34	22.8
	CHI SQ = 12.540 DF = 2 P = 0.002			CHI SQ = 1.853 DF = 2 P = 0.377			CHI SQ = 3.457 DF = 2 P = 0.178			CHI SQ = 3.873 DF = 2 P = 0.144		

Table 10-4 (continued)

VISION PROBLEMS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	n	%	N	n	%	N	n	%	N	n	%
STRABISMUS												
Sample A	74	4	5.4	42	2	4.8	56	8	14.3	35	4	11.4
Sample B	56	3	5.4	40	6	15.0	11	2	18.2	31	0	0.0
Sample C	97	13	13.4	108	6	5.6	99	16	16.2	159	9	5.7
	CHI SQ = 4.444 DF = 2 P = 0.108			CHI SQ = 4.351 DF = 2 P = 0.113			CHI SQ = 0.152 DF = 2 P = 0.927			CHI SQ = 3.958 DF = 2 P = 0.138		
CONVERGENCE												
Sample A	74	0	0.0	42	3	7.1	56	1	1.8	35	5	14.3
Sample B	56	1	1.8	40	6	15.0	11	1	9.1	31	1	3.2
Sample C	97	4	4.1	108	10	9.3	99	2	2.0	158	10	6.3
	CHI SQ = 3.374 DF = 2 P = 0.185			CHI SQ = 1.558 DF = 2 P = 0.459			CHI SQ = 2.245 DF = 2 P = 0.325			CHI SQ = 3.567 DF = 2 P = 0.168		
HYPEROPIA												
Sample A	73	1	1.4	42	2	4.8	54	2	3.7	34	6	17.6
Sample B	55	1	1.8	39	2	5.1	11	0	0.0	31	2	6.5
Sample C	93	0	0.0	104	6	5.8	99	6	6.1	152	13	8.6
	CHI SQ = 1.537 DF = 2 P = 0.464			CHI SQ = 0.067 DF = 2 P = 0.967			CHI SQ = 1.023 DF = 2 P = 0.600			CHI SQ = 3.060 DF = 2 P = 0.217		
MYOPIA												
Sample A	73	1	1.4	42	1	2.4	54	0	0.0	34	0	0.0
Sample B	55	0	0.0	39	1	2.6	11	0	0.0	31	1	3.2
Sample C	93	0	0.0	104	1	1.0	99	0	0.0	152	1	0.7
	CHI SQ = 2.037 DF = 2 P = 0.361			CHI SQ = 0.653 DF = 2 P = 0.721						CHI SQ = 2.234 DF = 2 P = 0.327		

Table 10-4 (continued)

VISION PROBLEMS FOR COMBINED GROUPS OF HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS AMONG SAMPLES WITHIN SITE

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	n	%	N	n	%	N	n	%	N	n	%
ASTIGMATISM												
Sample A	74	1	1.4	41	8	19.5	56	9	16.1	36	3	8.3
Sample B	56	2	3.6	40	5	12.5	11	2	18.2	31	2	6.5
Sample C	98	4	4.1	109	15	13.8	100	13	13.0	138	13	9.4
	CHI SQ = 1.119 DF = 2 P = 0.571			CHI SQ = 0.986 DF = 2 P = 0.611			CHI SQ = 0.414 DF = 2 P = 0.813			CHI SQ = 0.289 DF = 2 P = 0.865		
VISUAL ACUITY												
Sample A	73	2	2.7	39	1	2.6	53	0	0.0	30	1	3.3
Sample B	53	0	0.0	29	0	0.0	11	0	0.0	29	2	6.9
Sample C	90	1	1.1	91	4	4.4	99	2	2.0	137	6	4.4
	CHI SQ = 1.770 DF = 2 P = 0.413			CHI SQ = 1.452 DF = 2 P = 0.484			CHI SQ = 1.309 DF = 2 P = 0.520			CHI SQ = 0.474 DF = 2 P = 0.789		

Table 10-5

Regression Analysis of the Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
OCULOMOTILITY	684	Greene & Humphreys	-.16**	.02
		St. Clair	.13**	.03
		Maricopa	-.95**	.03
		Mingo	.98	
		Program		
		Head Start	.52	.03
		Non-Head Start	-.52	.03
		Constant	1.04	
	Statistics	F = 12.35** R^2 = .11	MS_e = .14	
		Site		
STRABISMUS	684	Greene & Humphreys	-.12	.02
		St. Clair	-.71	.02
		Maricopa	.66**	.22
		Mingo	.17	
		Program		
		Head Start	-.34	.02
		Non-Head Start	.34	.02
		Constant	1.26	
	Statistics	F = 3.44** R^2 = .03	MS_e = .08	

[a] Adjusted for child's gender, race, mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 10-5 (continued)

Regression Analysis of the Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
CONVERGENCE	684	Greene & Humphreys	-.33*	.01
		St. Clair	.38*	.02
		Maricopa	-.36*	.02
		Mingo	.31	
		Program		
		Head Start	.52	.02
		Non-Head Start	-.52	.02
		Constant	1	
	Statistics	F = 2.65**	R^2 = .03	MS_e = .04
		Site		
HYPEROPIA	684	Greene & Humphreys	-.31*	.01
		St. Clair	.21	.01
		Maricopa	-.70	.02
		Mingo	.80	
		Program		
		Head Start	.15	.02
		Non-Head Start	-.15	.02
		Constant	1.11	
	Statistics	F = 1.61	R^2 = .02	MS_e = .04

[a] Adjusted for child's gender, race, mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

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Table 10-5 (continued)

Regression Analysis of the Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
MYOPA	684	Greene & Humphreys	too small	to enter
		St. Clair	.24	.01
		Maricopa	-.85	.01
		Mingo		
		Program		
		Head Start	-.13	.01
		Non-Head Start	.13	.01
		Constant	1.02	
	Statistics	F = .79 R^2 = .01 MS_e = .01		
		Site		
ASTIGMATISM		Greene & Humphreys	-.69**	.02
		St. Clair	.37	.02
		Maricopa	.43	.02
		Mingo	-.11	.02
		Program		
		Head Start	-.31	.02
		Non-Head Start	.31	.02
		Constant	1.28	
	Statistics	F = 3.68** R^2 = .04 MS_e = .08		

[a] Adjusted for child's gender, race, mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 10-5 (continued)

Regression Analysis of the Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	se_b
		Site		
STEREO ACUITY	684	Greene & Humphreys	-.18	.02
		St. Clair	.83**	.03
		Maricopa	-.51	.03
		Mingo	-.14	
		Program		
		Head Start	.51	.03
		Non-Head Start	-.51	.03
		Constant	1.06	
	Statistics	F = 2.02*	R^2 = .02	MS_e = .13
		Site		
VISUAL ACUITY	684	Greene & Humphreys	-.13	.01
		St. Clair	.85	.01
		Maricopa	-.14	.01
		Mingo	-.58	
		Program		
		Head Start	too small to enter	
		Non-Head Start		
		Constant	1.14	
	Statistics	F = 1.86	R^2 = .02	MS_e = .03

[a] Adjusted for child's gender, race, mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 10-5 (continued)

Regression Analysis of the Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	se_b
		Site		
BINOCULAR FUNCTION	684	Greene & Humphreys	-.85	.03
		St. Clair	-.51	.03
		Maricopa	.87*	.03
		Mingo	.49	
		Program		
		Head Start	-.53	.03
		Non-Head Start	.53	.03
		Constant	1.21	

Statistics F = 4.64** R^2 = .05 MS_e = .19

---

[a] Adjusted for child's gender, race, mother's education

[b] Centered without weights.

[c] MS_e is residual mean square.

Table 10-6

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
STEREOSCOPIC VISION	204	Head Start	.15**	.05	F = 2.94*
					R^2 = .06
		Constant	1.02		MS_e = .11
		St. Clair			
STEREOSCOPIC VISION	204	Head Start	.50	.07	F = 2.01
					R^2 = .04
		Constant	1.81		MS_e = .17
		Maricopa			
STEREOSCOPIC VISION	204	Head Start	-.10	.06	F = .40
					R^2 = .01
		Constant	1.48		MS_e = .12
		Mingo			
STEREOSCOPIC VISION	204	Head Start	-.28	.06	F = .69
					R^2 = .02
		Constant	.92		MS_e = .13

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
STRABISMUS	204	Head Start	-.51	.04	F = 1.47
					R^2 = .03
		Constant	1.29		MS_e = .07
		St. Clair			
STRABISMUS	204	Head Start	-.56	.04	F = 1.50
					R^2 = .04
		Constant	1.09		MS_e = .07
		Maricopa			
STRABISMUS	204	Head Start	-.87	.06	F = 1.85
					R^2 = .04
		Constant	1.40		MS_e = .13
		Mingo			
STRABISMUS	204	Head Start	-.60	.03	F = .36
					R^2 = .01
		Constant	1.11		MS_e = .05

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
OCULOMOTILITY	204				
		Head Start	to small to	enter	F = 4.31**
					R^2 = .06
		Constant	1.04		MS_e = .02
		St. Clair			
OCULOMOTILITY	204				
		Head Start	.90	.08	F = 2.00
					R^2 = .05
		Constant	.30		MS_e = .21
		Maricopa			
OCULOMOTILITY	204				
		Head Start	-.12	.06	F = .18
					R^2 = .004
		Constant	1.28		MS_e = .13
		Mingo			
OCULOMOTILITY	204				
		Head Start	-.30	.08	F = .81
					R^2 = .02
		Constant	1.33		MS_e = .22

[a] Adjusted for gender, race, mother's educaton.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
CONVERGENCE	204	Head Start	-.48	.01	F = .51
					R^2 = .01
		Constant	1.00		MS_e = .01
		St. Clair			
CONVERGENCE	204	Head Start	.52	.04	F = .80
					R^2 = .02
		Constant	.86		MS_e = .07
		Maricopa			
CONVERGENCE	204	Head Start	-.15	.03	F = .11
					R^2 = .002
		Constant	.98		MS_e = .03
		Mingo			
CONVERGENCE	204	Head Start	too small to enter		F = .44
					R^2 = .01
		Constant	1.11		MS_e = .07

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
HYPEROPIA	204	Head Start	-.29	.01	F = 1.97
					R^2 = .02
		Constant	1.12		MS_e = .01
		St. Clair			
HYPEROPIA	204	Head Start	.74	.04	F = 1.42
					R^2 = .04
		Constant	.84		MS_e = .06
		Maricopa			
HYPEROPIA	204	Head Start	.62	.03	F = .08
					R^2 = .001
		Constant	1.05		MS_e = .04
		Mingo			
HYPEROPIA	204	Head Start	too small	to enter	F = .99
					R^2 = .02
		Constant	1.34		MS_e = .06

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

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Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]	
			b	SE_b		
		Greene & Humphreys				
MYOPIA	204					
		Head Start	-.13	.01	F =	.50
					R^2 =	.01
		Constant	1.00		MS_e =	.004
		St. Clair				
MYOPIA	204					
		Head Start	.12	.01	F =	.22
					R^2 =	.01
		Constant	.98		MS_e =	.01
		Maricopa				
MYOPIA	204					
		Head Start			F =	
					R^2 =	
		Constant			MS_e =	
		Mingo				
MYOPIA	204					
		Head Start			F =	2.00
					R^2 =	.03
		Constant	1.09		MS_e =	.01

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
ASTIGMATISM	204				
		Head Start	-.76	.02	F = 2.31
					R^2 = .04
		Constant	1.15		MS_e = .03
		St. Clair			
ASTIGMATISM	204				
		Head Start	.20	.06	F = .49
					R^2 = .01
		Constant	1.28		MS_e = .12
		Maricopa			
ASTIGMATISM	204				
		Head Start	-.74	.06	F = .61
					R^2 = .02
		Constant	1.33		MS_e = .12
		Mingo			
ASTIGMATISM	204				
		Head Start	-.69	.05	F = .88
					R^2 = .02
		Constant	1.22		MS_e = .08

---

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b]		Statistics[c]
			b	SE_b	
		Greene & Humphreys			
VISUAL ACUITY	204	Head Start	.86	.02	F = 1.26
					R^2 = .02
		Constant	1.08		MS_e = .01
		St. Clair			
VISUAL ACUITY	204	Head Start	.90	.03	F = 1.09
					R^2 = .03
		Constant	1.29		MS_e = .03
		Maricopa			
VISUAL ACUITY	204	Head Start	-.73	.02	F = .16
					R^2 = .004
		Constant	1.13		MS_e = .01
		Mingo			
VISUAL ACUITY	204	Head Start	too small	to enter	F = 1.37
					R^2 = .02
		Constant	1.34		MS_e = .05

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

Table 10-6 (continued)

Regression Analysis of Vision Measures

All Posttested Children

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE$_b$	Statistics[c]
		Greene & Humphreys			
BINOCULAR VISION	204	Head Start	.39	.06	F = 3.70**
					R^2 = .07
		Constant	1.09		MS_e = .17
		St. Clair			
BINOCULAR VISION	204	Head Start	-.79	.06	F = 1.09
					R^2 = .03
		Constant	1.41		MS_e = .15
		Maricopa			
BINOCULAR VISION	204	Head Start	-.16	.08	F = 1.52
					R^2 = .04
		Constant	2.23		MS_e = .24
		Mingo			
BINOCULAR VISION	204	Head Start	-.28	.07	F = .93
					R^2 = .02
		Constant	1.39		MS_e = .19

[a] Adjusted for gender, race, mother's education.

[b] Centered without weights

[c] MS_e is residual mean square

CHAPTER ELEVEN

APPENDIX TABLES

Table 11-1

Comparison of Evaluation Findings and those Reported in Head Start Health Records

Head Start Records		Head Start Children (Samples A, B, and C) in:									
		Greene & Humphreys Counties		St. Clair County		Maricopa County		Mingo County		All Sites	
		Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings	Findings	No Findings
Vision	N	3	42	2	43	10	90	10	74	25	249
Agree	n	0	39	0	40	5	82	6	64	11	225
	%	0.0	92.9	0.0	93.0	50.0	91.9	60.0	86.5	44.0	90.4
Disagree	n	3	3	2	3	5	8	4	10	14	24
	%	100.0	7.1	100.0	7.0	50.0	8.9	40.0	13.5	56.0	9.6
		$p < 0.632$		$p < 0.699$		$p < 0.000$		$p < 0.000$		$p < 0.000$	

Table 11-2

HEARING PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
ANY HEARING LOSS	N	124	90	105	75	105	60	119	105
	n	16	14	15	11	7	4	16	9
	%	12.9	15.6	14.3	14.7	6.7	6.7	13.4	8.6
		CHI SQ = 0.304		CHI SQ = 0.005		CHI SQ = 0.000		CHI SQ = 1.336	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.581		P = 0.943		P = 1.000		P = 0.248	
HEARING LOSS IN SPEAKING RANGE (500,1000,2000 HZ)	N	123	90	101	75	105	59	117	104
	n	13	13	12	10	7	3	15	9
	%	10.6	14.4	11.9	13.3	6.7	5.1	12.8	8.7
		CHI SQ = 0.728		CHI SQ = 0.083		CHI SQ = 0.165		CHI SQ = 0.987	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.393		P = 0.773		P = 0.684		P = 0.320	
HEARING LOSS AT 4000 HZ	N	124	90	103	75	105	59	117	104
	n	9	8	9	6	6	4	15	8
	%	7.3	8.9	8.7	8.0	5.7	6.8	12.8	7.7
		CHI SQ = 0.190		CHI SQ = 0.031		CHI SQ = 0.075		CHI SQ = 1.553	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.663		P = 0.861		P = 0.784		P = 0.213	
DEFICIENCY IN MIDDLE EAR IMPEDANCE	N	105	85	99	69	104	60	113	109
	n	5	10	11	7	10	1	24	16
	%	4.8	11.8	11.1	10.1	9.6	1.7	21.2	14.7
		CHI SQ = 3.168		CHI SQ = 0.040		CHI SQ = 3.842		CHI SQ = 1.616	
		DF = 1		DF = 1		DF = 1		DF = 1	
		P = 0.075		P = 0.842		P = 0.050		P = 0.204	

Table 11-2 Continued

HEARING PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS WITHIN SITE

		Greene/Humphreys		St.Clair		Maricopa		Mingo	
		HS	NHS	HS	NHS	HS	NHS	HS	NHS
OTITIS MEDIA	N	127	101	108	86	106	61	119	109
	n	17	10	13	13	16	6	15	12
	%	13.4	9.9	12.0	15.1	15.1	9.8	12.6	11.0
		CHI SQ = 0.654 DF = 1 P = 0.418		CHI SQ = 0.391 DF = 1 P = 0.532		CHI SQ = 0.936 DF = 1 P = 0.333		CHI SQ = 0.139 DF = 1 P = 0.709	
HEARING LOSS AT 500 HZ AND DEFICIENCY IN IMPEDANCE	N	104	78	94	62	104	59	111	104
	n	4	6	7	5	4	0	13	8
	%	3.8	7.7	7.4	8.1	3.8	0.0	11.7	7.7
		CHI SQ = 1.270 DF = 1 P = 0.260		CHI SQ = 0.020 DF = 1 P = 0.887		CHI SQ = 2.326 DF = 1 P = 0.127		CHI SQ = 0.984 DF = 1 P = 0.321	
HEARING LOSS AT 500 HZ AND OTITIS MEDIA	N	124	90	101	75	105	59	117	104
	n	3	3	4	6	1	1	6	5
	%	2.4	3.3	4.0	8.0	1.0	1.7	5.1	4.8
		CHI SQ = 0.160 DF = 1 P = 0.689		CHI SQ = 1.311 DF = 1 P = 0.252		CHI SQ = 0.173 DF = 1 P = 0.678		CHI SQ = 0.012 DF = 1 P = 0.913	

Table 11-3

Hearing Problems for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples Within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	n	%	N	n	%	N	n	%	N	n	%
ANY HEARING LOSS												
Sample A	73	9	12.3	42	5	11.9	56	6	10.7	35	3	8.6
Sample B	53	6	11.3	37	3	8.1	11	0	0.0	31	1	3.2
Sample C	88	15	17.0	101	18	17.8	98	5	5.1	158	21	13.3
	CHI SQ = 1.162 DF = 2 P = 0.559			CHI SQ = 2.353 DF = 2 P = 0.308			CHI SQ = 2.646 DF = 2 P = 0.266			CHI SQ = 2.928 DF = 2 P = 0.231		
HEARING LOSS IN SPEAKING RANGE												
Sample A	72	6	8.3	42	5	11.9	56	6	10.7	34	3	8.8
Sample B	53	6	11.3	37	3	8.1	11	0	0.0	29	1	3.4
Sample C	88	14	15.9	97	14	14.4	97	4	4.1	158	20	12.7
	CHI SQ = 2.172 DF = 2 P = 0.337			CHI SQ = 0.997 DF = 2 P = 0.607			CHI SQ = 3.459 DF = 2 P = 0.177			CHI SQ = 2.319 DF = 2 P = 0.314		
HEARING LOSS AT 4000 HZ												
Sample A	73	7	9.6	42	3	7.1	56	5	8.9	34	2	5.9
Sample B	53	2	3.8	37	2	5.4	11	0	0.0	29	1	3.4
Sample C	88	8	9.1	99	10	10.1	97	5	5.2	158	20	12.7
	CHI SQ = 1.689 DF = 2 P = 0.430			CHI SQ = 0.887 DF = 2 P = 0.642			CHI SQ = 1.649 DF = 2 P = 0.438			CHI SQ = 3.111 DF = 2 P = 0.211		
DEFICIENCY IN MIDDLE EAR IMPEDANCE												
Sample A	65	4	6.2	39	3	7.7	55	4	7.3	35	8	22.9
Sample B	44	3	6.8	34	2	5.9	11	1	9.1	31	3	9.7
Sample C	81	8	9.9	95	13	13.7	98	6	6.1	156	29	18.6
	CHI SQ = 0.779 DF = 2 P = 0.677			CHI SQ = 2.078 DF = 2 P = 0.354			CHI SQ = 0.182 DF = 2 P = 0.913			CHI SQ = 2.049 DF = 2 P = 0.359		

Table 11-3 Continued

Hearing Problems for Combined Groups of Head Start and Non-Head Start Children with Unadjusted Comparisons Among Samples Within Site

	Greene/Humphreys			St.Clair			Maricopa			Mingo		
	N	n	%	N	n	%	N	n	%	N	n	%
OTITIS MEDIA												
Sample A	74	5	6.8	42	5	11.9	56	7	12.5	36	2	5.6
Sample B	56	7	12.5	41	5	12.2	11	1	9.1	31	1	3.2
Sample C	98	15	15.3	111	16	14.4	100	14	14.0	161	24	14.9
	CHI SQ = 2.983 DF = 2 P = 0.225			CHI SQ = 0.231 DF = 2 P = 0.891			CHI SQ = 0.242 DF = 2 P = 0.886			CHI SQ = 5.016 DF = 2 P = 0.081		
HEARING LOSS-500 HZ, IMPEDANCE DEFICIENCY												
Sample A	64	3	4.7	39	3	7.7	55	3	5.5	33	3	9.1
Sample B	42	1	2.4	31	1	3.2	11	0	0.0	29	1	3.4
Sample C	76	6	7.9	86	8	9.3	97	1	1.0	153	17	11.1
	CHI SQ = 1.708 DF = 2 P = 0.426			CHI SQ = 1.185 DF = 2 P = 0.553			CHI SQ = 3.166 DF = 2 P = 0.205			CHI SQ = 1.644 DF = 2 P = 0.439		
HEARING LOSS AT 500 HZ AND OTITIS MEDIA												
Sample A	73	1	1.4	42	2	4.8	56	1	1.8	34	1	2.9
Sample B	53	0	0.0	37	0	0.0	11	0	0.0	29	0	0.0
Sample C	88	5	5.7	97	8	8.2	97	1	1.0	158	10	6.3
	CHI SQ = 4.754 DF = 2 P = 0.093			CHI SQ = 3.487 DF = 2 P = 0.175			CHI SQ = 0.313 DF = 2 P = 0.855			CHI SQ = 2.427 DF = 2 P = 0.297		

Table 11-4

HEARING PROBLEMS FOR HEAD START AND NON-HEAD START CHILDREN WITH UNADJUSTED COMPARISONS BETWEEN HEAD START AND NON-HEAD START GROUPS ACROSS SITE

	HEAD START			NON-HEAD START					
	N	n	%	N	n	%	CHI SQ	DF	P
ANY HEARING LOSS	453	54	11.9	330	38	11.5	0.030	1	0.862
HEARING LOSS IN SPEAKING RANGE	446	47	10.5	328	35	10.7	0.004	1	0.983
HEARING LOSS AT 4000 HZ	449	39	8.7	328	26	7.9	0.142	1	0.706
DEFICIENCY IN MIDDLE EAR IMPEDANCE	421	50	11.9	323	34	10.5	0.333	1	0.564
OTITIS MEDIA	460	61	13.3	357	41	11.5	0.560	1	0.446
HEARING LOSS AT 500 HZ, IMPEDANCE DEFICIENCY	413	28	6.8	303	19	6.3	0.074	1	0.786
HEARING LOSS AT 500 HZ AND OTITIS MEDIA	447	14	3.1	328	15	4.6	1.091	1	0.296

Table 11-5

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b]	
			b	SE_b
		Site		
HEARING LOSS IN SPEAKING RANGE	683	Greene & Humphreys	.37	.02
		St. Clair	.46	.02
		Maricopa	.51	.02
		Mingo	-1.34	
		Program		
		Head Start	.98	.02
		Non-Head Start	-.98	.02
		Constant	.16	
	Statistics	$F = 1.24$ $R^2 = .02$ $MS_e = .09$		
		Site		
HEARING LOSS AT 4000 HZ	683	Greene & Humphreys	-.69	.02
		St. Clair	.11	.02
		Maricopa	-.29	.02
		Mingo	.87	
		Program		
		Head Start	.17	.02
		Non-Head Start	-.17	.02
		Constant	.21	
	Statistics	$F = 1.80$ $R^2 = .02$ $MS_e = .07$		

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5
(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b
		Site		
TYMPANOGRAM	683	Greene & Humphreys	-.12	.02
		St. Clair	-.53	.02
		Maricopa	-.44	.02
		Mingo	1.09	
		Program		
		Head Start	.33	.02
		Non-Head Start	-.33	.02
		Constant	.23	
	Statistics	F = 3.06	R^2 = .04	MS_e = .09
		Site		
HEARING LOSS AT 500 HZ AND OTITIS MEDIA	683	Greene & Humphreys	-.21	.01
		St. Clair	.36	.02
		Maricopa	-.27	.01
		Mingo	.12	
		Program		
		Head Start	-.78	.01
		Non-Head Start	.78	.01
		Constant	.56	
	Statistics	F = 1.29	R^2 = .02	MS_e = .04

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5

(Continued)

Regression Analysis of Hearing Evaluation
Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b
		Site		
OTITIS MEDIA	683	Greene & Humphreys	-.17	.02
		St. Clair	.18	.03
		Maricopa	.28	.03
		Mingo	-.29	
		Program		
		Head Start	.21	.03
		Non-Head Start	-.21	.03
		Constant	.42	
		Statistics F = .93 R^2 = .01 MS_e = .11		
		Site		
HEARING LOSS AT 500 HZ AND TYMPANOGRAM FAILURE	683	Greene & Humphreys	-.75	.02
		St. Clair	.25	.02
		Maricopa	-.48	.02
		Mingo	.98	
		Program		
		Head Start	.17	.02
		Non-Head Start	-.17	.02
		Constant	.14	
		Statistics F = 1.59 R^2 = .02 MS_e = .06		

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5

(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
HEARING LOSS IN SPEAKING RANGE	176	Head Start	-.10	.04	F = 2.03
					R^2 = .07
		Constant	.36		MS_e = .08
		St. Clair			
HEARING LOSS IN SPEAKING RANGE	176	Head Start	-.14	.06	F = .56
					R^2 = .02
		Constant	.17		MS_e = .12
		Maricopa			
HEARING LOSS IN SPEAKING RANGE	176	Head Start	too small to enter		F = 1.03
					R^2 = .03
		Constant	.70		MS_e = .05
		Mingo			
HEARING LOSS IN SPEAKING RANGE	176	Head Start	.55	.05	F = .60
					R^2 = .02
		Constant	.13		MS_e = .10

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5
(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
HEARING LOSS AT 4000 HZ	176	Head Start	too small to enter		$F = 4.88$
					$R^2 = .10$
		Constant	.37		$MS_e = .05$
		St. Clair			
HEARING LOSS AT 4000 HZ	176	Head Start	.85	.05	$F = .47$
					$R^2 = .02$
		Constant	.12		$MS_e = .07$
		Maricopa			
HEARING LOSS AT 4000 HZ	176	Head Start	-.25	.04	$F = .53$
					$R^2 = .02$
		Constant	.91		$MS_e = .06$
		Mingo			
HEARING LOSS AT 4000 HZ	176	Head Start	.73	.05	$F = .63$
					$R^2 = .02$
		Constant	.15		$MS_e = .10$

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5

(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
TYMPANOGRAM FAILURE EITHER EAR	176	Head Start	-.56	.04	F = 2.89
					R^2 = .09
		Constant	.41		MS_e = .04
		St. Clair			
TYMPANOGRAM FAILURE EITHER EAR	176	Head Start	.32	.05	F = .68
					R^2 = .03
		Constant	.19		MS_e = .08
		Maricopa			
TYMPANOGRAM FAILURE EITHER EAR	176	Head Start	.99	.04	F = 1.17
					R^2 = .04
		Constant	.48		MS_e = .06
		Mingo			
TYMPANOGRAM FAILURE EITHER EAR	176	Head Start	.61	.06	F = .86
					R^2 = .03
		Constant	.28		MS_e = .14

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

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Table 11-5

(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	SE_b	Statistics[c]
		Greene & Humphreys			
HEARING LOSS AT 500 HZ AND OTITIS MEDIA		Head Start	.12	.02	F = .49
					R^2 = .01
		Constant	.31		MS_e = .02
		St. Clair			
HEARING LOSS AT 500 HZ AND OTITIS MEDIA		Head Start	-.63	.04	F = .96
					R^2 = .04
		Constant	.78		MS_e = .07
		Maricopa			
HEARING LOSS AT 500 HZ AND OTITIS MEDIA		Head Start	too small to enter		F = 1.83
					R^2 = .06
		Constant	.84		MS_e = .01
		Mingo			
HEARING LOSS AT 500 HZ AND OTITIS MEDIA		Head Start	too small to enter		F = 1.44
					R^2 = .03
		Constant	.56		MS_e = .05

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square

Table 11-5

(Continued)

Regression Analysis of Hearing Evaluation Measures on Posttest Sample (A,B,C)

Dependent Variable	Sample Size	Factors[a]	Effects[b] b	Effects[b] SE_b	Statistics[c]
		Greene & Humphreys			
HEARING LOSS AT 500 HZ AND TYMPANOGRAM FAILURE	176	Head Start	-.26	.03	F = 1.61
					R^2 = .05
		Constant	.25		MS_e = .05
		St. Clair			
HEARING LOSS AT 500 HZ AND TYMPANOGRAM FAILURE	176	Head Start	.96	.05	F = .31
					R^2 = .01
		Constant	.12		MS_e = .07
		Maricopa			
HEARING LOSS AT 500 HZ AND TYMPANOGRAM FAILURE	176	Head Start	.44	.03	F = .71
					R^2 = .03
		Constant	.53		MS_e = .03
		Mingo			
HEARING LOSS AT 500 HZ AND TYMPANOGRAM FAILURE	176	Head Start	.52	.05	F = .67
					R^2 = .02
		Constant	.13		MS_e = .09

[a] Adjusted for race, sex, mother's education, family per capita income and family employment status.

[b] Centered without weights

[c] MS_e is residual mean square